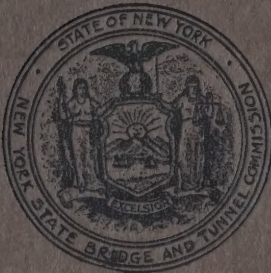


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**New York State Bridge and Tunnel Commission**  
**AND**  
**New Jersey Interstate Bridge and Tunnel Commission**



***Hudson River Vehicular Tunnel***

**CONTRACT NO. 6**

**OPEN APPROACHES AND TUNNELS BETWEEN PROVOST  
STREET AND A POINT ABOUT ONE THOUSAND (1,000)  
FEET WEST OF THE RIVER BULKHEAD NEAR THE  
LINE OF TWELFTH STREET PRODUCED,  
JERSEY CITY.**

***NEW JERSEY***

---

**INVITATION AND INFORMATION FOR BIDDERS, SPECIFICA-  
TIONS, FORMS OF CONTRACT, BONDS AND  
CONTRACTOR'S PROPOSAL**

---

**FORM ADOPTED BY THE COMMISSIONS OCTOBER 7, 1924, AND FILED ON  
COMMENCEMENT OF ADVERTISEMENT OF INVITATION AND  
INFORMATION FOR BIDDERS**

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**1924**







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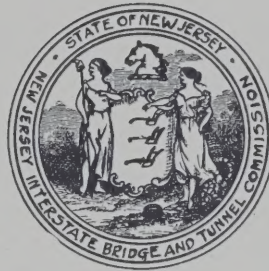
A. C. WILLARD

Ans. -----





**New York State Bridge and Tunnel Commission**  
AND  
**New Jersey Interstate Bridge and Tunnel Commission**



***Hudson River Vehicular Tunnel***

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**1924**







## NEW YORK STATE BRIDGE AND TUNNEL COMMISSION

and

## NEW JERSEY INTERSTATE BRIDGE AND TUNNEL COMMISSION

NEW YORK STATE BRIDGE AND  
TUNNEL COMMISSION

GEORGE R. DYER, Chairman  
E. W. BLOOMINGDALE, Vice-Chairman  
McDOUGALL HAWKES  
A. J. SHAMBERG  
WILLIAM W. MILLS  
Commissioner of Plant and Structures of  
New York City  
DWIGHT B. LA DU  
State Engineer and Surveyor  
PAUL WINDELS, Counsel  
MORRIS M. FROHLICH, Secretary

NEW JERSEY INTERSTATE BRIDGE  
AND TUNNEL COMMISSION

THEODORE BOETTGER, Chairman  
JOHN B. KATES, Vice-Chairman  
THOMAS J. S. BARLOW  
JOHN F. BOYLE  
ISAAC FERRIS  
WELLER H. NOYES  
ROBERT S. SINCLAIR  
FRANK L. SUPLEE  
ROBERT CAREY, Counsel  
JOHN C. McENROE, Secretary

CLIFFORD M. HOLLAND  
Chief Engineer







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## **Invitation and Information for Bidders.**

The New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission invite proposals to construct a portion of two (2) tunnels as approaches to the river section of a Vehicular Tunnel under the Hudson River.

The tunnels will begin about one thousand (1,000) feet west of the present bulkhead in the Erie Railroad Yard, Jersey City, New Jersey, and extend in a westerly direction; the north tunnel passing under the Delaware, Lackawanna and Western Railroad Yard, terminating at grade in Fourteenth Street at the east side of Provost Street, and the south tunnel passing under the Erie Railroad Yard, terminating at grade in Twelfth Street at the east side of Provost Street. In addition to the tunnels, this contract includes the construction of air ducts and foundations sunk by the compressed air method located at the shafts near the river bulkhead.

The work under this contract will include the care and support of all surface, subsurface and overhead structures or works, the maintenance of railroad and street traffic and the restoration of all structures disturbed by the Contractor's operations.

Plant sites, as indicated on the contract drawings, will be furnished to the Contractor for his use. The Contractor will be required to remove the buildings now occupying these sites in a manner and at such time as hereinafter provided.

Bidders must examine the form of contract and the specifications and the contract drawings, must visit the location of the work, inform themselves of the conditions along the line of the work, and must make their own esti-

INFORMATION FOR BIDDERS.

mates of the facilities and difficulties attending the execution of the work.

The contract requirements include provisions for an adequate plant, maintenance of traffic, access to buildings, safeguarding tunnels, buildings, tracks, other structures and all works, including underpinning where necessary, good quality of material and workmanship, the conduct of the work by methods most conducive to safety and the completion of the work within the time prescribed.

A more detailed description of the work to be done and other requirements, provisions, details and specifications are given in the form of contract and specifications, copies of which may be purchased at the office of the Commissions, Room 3004 Woolworth Building, 233 Broadway, Borough of Manhattan, New York City.

Part of the work of this contract is performed within the limits of the yards of the Erie Railroad Company and the Delaware, Lackawanna and Western Railroad Company. The obligations of the Commissions with respect to the performance of the work in the Erie Railroad Yard are fully set forth in a certain contract entered into between the Commissions and the Erie Railroad Company, *et al.*, dated December 7, 1921; certain of the obligations therein, the Contractor will be required to assume. Copies of the said Erie Agreement are on file in the office of the Commissions and may be therein inspected upon application during the office hours of the Commissions.

Partial payments to the Contractor will be made, as the work proceeds, as provided in the contract.

The Contractor will be required to begin work within fifteen (15) days after the date of the delivery of the contract, and must complete the work as soon as practicable and within a period of eighteen (18) months after the date of the delivery of the contract.

Sealed bids or proposals will be received at the office of the Commissions, Room 3004 Woolworth Building, 233



INFORMATION FOR BIDDERS.

Broadway, Borough of Manhattan, New York City, until the twelfth day of November, 1924, at two (2:00) o'clock P. M., Eastern Standard Time, at which time or at a later date, to be fixed by the Commissions, the proposals will be publicly opened. Proposals must be in the form prescribed by the Commissions.

A statement based upon the estimate of the Chief Engineer of the Commissions, of the quantities of the various classes of the work and of the nature and extent, as near as practicable, of the work required is to be found in the schedule forming a part of the Contractor's proposal. The quantities given in such schedule are approximate only, being given as a basis for the uniform comparison of bids, and no claim is to be made against the State of New York or the State of New Jersey for damages or anticipated profit or loss of profit on account of any excess or deficiency, absolute or relative, in the same. The Commissions reserve the right, as stated in the contract, to increase or to diminish or to omit entirely any of the quantities listed in the schedule.

*The unit prices must not be improperly balanced, and any bid which the Commissions consider detrimental to the interests of the States may be rejected.*

Every proposal, when submitted, must be enclosed in a sealed envelope endorsed "Proposal for Constructing the New Jersey Approach Section of the Hudson River Vehicular Tunnel" and must be delivered to the Commissions or their Secretaries, and in the presence of the person submitting the proposal it will be deposited in a sealed box in which all proposals will be deposited.

No proposal will be received or deposited unless accompanied by two certified checks, for fifty thousand dollars (\$50,000) each, one payable to the order of the "Comptroller of the State of New York" and the other payable to the order of "The New Jersey Interstate Bridge and Tunnel Commission," and drawn upon National or State Banks or Trust Companies satisfactory to the Com-

INFORMATION FOR BIDDERS.

missions, and having their principal offices in New York City or in the Cities of Newark or Jersey City. SUCH CHECKS MUST NOT BE ENCLOSED IN THE ENVELOPE CONTAINING THE PROPOSAL. A receipt will be given for these checks. Unless forfeited under the conditions herein stipulated such checks will be returned to the bidders upon surrender of the receipts at the time herein provided.

No proposal will be considered unless the consent to become surety for the faithful performance of the contract, in case the same is awarded to the bidder, as contained in the Contractor's Proposal herein, is duly executed by two or more bonding or surety companies authorized to do business under the laws of the State of New York or the State of New Jersey or by two or more individuals. The corporations or individuals executing the consent must submit with the bid a detailed statement in affidavit form setting forth a list of their assets and liabilities. In order to be acceptable to the Commissions, the proposed sureties must show an excess of assets over liabilities in an amount equal to or greater than the proposed bond, which assets must consist either of improved real estate, first mortgages, bonds or stocks, approved by the Commissions.

No proposal, after it shall have been deposited with the Commissions, shall be withdrawn for any reason whatsoever.

The award of the contract will be made by the Commissions as soon as practicable after the acceptance of the bids and the contract will be awarded or all bids will be rejected within thirty (30) days after the opening of the bids, but the Commissions reserve the right to extend this time as in their opinion public interest may require.

The bidder whose proposal is accepted will be notified of such acceptance and whether the sureties proposed are approved by the Commissions.

If the sureties named in the proposal are approved by



INFORMATION FOR BIDDERS.

the Commissions, the bidder within five (5) days after such notification shall, in person or by duly authorized representative, attend at the said office of the Commissions, and such bidder shall then deliver a contract in the form herein provided, duly executed and with its execution duly proved.

If the sureties named in the proposal are not approved by the Commissions, the bidder naming such sureties will be required to substitute other sureties approved by the Commissions within five (5) days after notice of such disapproval or within such further period, if any, as may be prescribed by the Commissions. Within five (5) days after such approval, the bidder shall deliver the contract duly executed and approved in the manner stated above.

At the time of the delivery of the contract, the Contractor will be required to furnish security to the State of New York by depositing a bond in the sum of Two hundred fifty thousand dollars (\$250,000.) and security to the State of New Jersey by depositing a bond in the sum of Two hundred fifty thousand dollars (\$250,000.). These bonds must be in the forms annexed to the contract.

Deposits made by bidders whose proposals are not accepted will be returned within three (3) days after the contract is executed and delivered and its provisions in respect to the bonds are complied with, unless all proposals shall be rejected, in which event such deposits will be returned within three (3) days after such rejection. The deposit of the successful bidder will be returned when the contract is executed and its provisions in respect to the bonds are complied with.

To assist the Commissions in determining who is the lowest responsible bidder, the Commissions or the Chief Engineer may require the bidder to produce satisfactory evidence of his experience in the kind of work required under this contract and his ability to perform same.

On the part of the State of New Jersey any waiver

INFORMATION FOR BIDDERS.

affecting the time of advertisement and time of opening bids, the amount of the certified check or bond or any provisions relating thereto, or the time of the award, will be determined by the New Jersey Commission, with the consent of the State House Commission, as in their opinion the public interest may require.

No right shall be deemed to accrue to any bidder by reason of the submission of any bid hereunder, or by the waiver or non-enforcement of any provisions or requirement of the invitation.

The right to reject any and all bids is reserved.

## CONTRACT.

## CHAPTER I.

## PREMISES.

**Agreement**, made this                      day of  
One thousand nine hundred twenty-four, between the  
New York State Bridge and Tunnel Commission, acting  
for and in behalf of the State of New York, and the New  
Jersey Interstate Bridge and Tunnel Commission, acting  
for and in behalf of the State of New Jersey, herein-  
after called the "Commissions," parties of the first part,  
AND

hereinafter called the "Contractor," part\* of the  
second part:

### ENABLING RESOLUTIONS.

WHEREAS, the Commissions are authorized by law by the State of New York and the State of New Jersey, respectively, to construct a tunnel or tunnels under the Hudson River, one-half of the cost of which shall be paid by each of the respective States; and

WHEREAS, there has been set aside out of the moneys made available by the State of New York for the use of the New York State Bridge and Tunnel Commission and available for the purpose of this contract, the sum of

dollars, (\$ )  
and the said Commission has certified to the New Jersey

\*Here and in like blanks hereafter insert "y" or "ies" as the case may be.



ENABLING RESOLUTIONS.

Interstate Bridge and Tunnel Commission as follows,  
to wit:

New York  
Certificate

"The New York State Bridge and Tunnel Commission hereby certifies to the New Jersey Interstate Bridge and Tunnel Commission that it has available to the said New York Commission, for the purposes of the construction of a vehicular tunnel or tunnels under the Hudson River, the sum of

dollars, (\$ )

for the purpose of paying out of the said sum hereby set aside its share, to wit, one-half of a certain contract for the construction of an approach section of the proposed vehicular tunnel under the Hudson River to be made by this Commission and the New Jersey Interstate Bridge and Tunnel Commission, parties of the first part and

part of the second part, dated the  
day of , 1924"; and

WHEREAS, there has been set aside out of the moneys made available by the State of New Jersey for the use of the New Jersey Interstate Bridge and Tunnel Commission and available for the purpose of this contract the sum of

dollars, (\$ )

and the said Commission has certified to the New York State Bridge and Tunnel Commission as follows, to wit:

New Jersey  
Certificate.

"The New Jersey Interstate Bridge and Tunnel Commission hereby certifies to the New York State Bridge and Tunnel Commission that it has available to the said New Jersey Commission, for the purposes of the con-

ENABLING RESOLUTIONS.

struction of a vehicular tunnel or tunnels under the Hudson River, the sum of

dollars, (\$ )

for the purpose of paying out of the said sum hereby set aside its share, to wit, one-half of a certain contract for the construction of an approach section of the proposed vehicular tunnel under the Hudson River to be made by this Commission and the New York State Bridge and Tunnel Commission, parties of the first part and

part of the second part, dated the  
day of „1924”; and

WHEREAS, the New York State Bridge and Tunnel Commission has adopted the following resolution:

New York  
Resolution.

“RESOLVED, that the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, pursuant to the authority vested in it by law, do enter into a contract jointly with the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, as parties of the first part, with

part of the second part, for the construction of an approach section of the proposed vehicular tunnel under the Hudson River, which contract is to be dated the  
day of ,  
1924; and be it further

“RESOLVED, that this Commission shall pay as its share of the said contract one-half of the amount determined to be due thereunder; and be it further

“RESOLVED, that this contract is deemed by this Com-

ENABLING RESOLUTIONS.

mission to be necessary for the construction of the said tunnel or tunnels and to be included in the cost of said construction; and be it further

“RESOLVED, that this Commission shall cause to be set aside out of the moneys available to this Commission for the construction of said tunnel or tunnels the sum of

dollars, (\$ )  
to meet its share of said contract”; and

New Jersey  
Resolution.

WHEREAS, the New Jersey Interstate Bridge and Tunnel Commission has adopted the following resolution:

“RESOLVED, that the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, pursuant to the authority vested in it by law, do enter into a contract jointly with the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, as parties of the first part, with

part of the second part, for the construction of an approach section of the proposed vehicular tunnel under the Hudson River, which contract is to be dated the day of , 1924; and be it further

“RESOLVED, that this Commission shall pay as its share of the said contract one-half of the amount determined to be due thereunder; and be it further

“RESOLVED, that this contract is deemed by this Commission to be necessary for the construction of the said tunnel or tunnels and to be included in the cost of said construction; and be it further

“RESOLVED, that the Treasurer of the State of New



CONSIDERATIONS.

Jersey, as custodian of 'The State Highway Extension Fund,' set apart out of the said fund or out of the proceeds of the State Highway Extension Bonds the sum of

dollars, (§ )  
for the purposes of this contract”;

**Now, Therefore,** in consideration of the mutual covenants and agreements hereinafter contained, the parties hereto do hereby for themselves, their heirs, executors, administrators, successors and assigns agree with each other as follows:

This contract shall bind the State of New York and the New York State Bridge and Tunnel Commission for one-half only of the amount of money to be expended hereunder.

Limitation  
of liability.

This contract shall likewise bind the State of New Jersey and the New Jersey Interstate Bridge and Tunnel Commission for the other one-half only of the amount of money to be expended hereunder.

This contract shall bind the respective States only to the extent of moneys available therefor, and no liability on account of this contract or obligation shall be incurred hereby by the respective States or Commissions beyond the moneys available for the purposes specified therein.

The Contractor admits that he is familiar with the laws of the State of New York and the laws of the State of New Jersey whereby the Commissions are authorized to construct a tunnel or tunnels under the Hudson River and that he is especially familiar with the authority, powers and limitations of authority and powers created or imposed by law upon the Commissions.

*The invitation and information for bidders hereto attached, the Contractor's bonds, the proposal submitted by the Contractor and the contract drawings herein described are hereby made a part of this contract.*

CHAPTER II.

GENERAL PROVISIONS AND DEFINITIONS.

Outline of  
contract.

ARTICLE I.—The Contractor agrees to construct the section of tunnel herein described, together with all the work necessary therefor or incidental thereto. The States agree to pay to the Contractor the sums of money hereinafter mentioned at the times and in the manner and upon the terms and conditions hereinafter set forth.

Marginal  
notes.

ARTICLE II.—Titles, headings, running headlines and marginal notes are printed hereon merely for convenience and shall not be deemed to be any part of this contract for any purpose whatever.

Definitions.

ARTICLE III.—The following words or groups of words used in this contract shall, unless the context clearly indicates another meaning is intended, be construed as follows:

“States.”

(1) The word “States” to mean the State of New York and the State of New Jersey.

“Commissions.”

(2) The word “Commissions” to mean the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission or the lawful successors of either or both of them.\*

“Contractor.”

(3) The word “Contractor” to mean the part of the second part to this contract and\*\*

and any and every person or corporation who or which shall at any time be liable in the place of or for the part of the second part to perform any obligations under this contract assumed by the part of the second part.

---

\*Whenever the term “States” or “Commissions” is used as referring to one of the contracting parties, the same shall be taken to mean the parties of the first part to this contract.

\*\*Here insert, as the case may be, either “its successors,” or “his executors,” “administrators,” or “their successors,” or “their executors,” “administrators.”

GENERAL PROVISIONS AND DEFINITIONS.

For convenience the Contractor is hereinafter referred to as if the Contractor were an individual. The word "he" shall, as the sense may require, include "she," "it" and "they"; the word "him" shall include "her," "it" and "them"; and the word "his" shall include "her," "its" and "their."

(4) The word "Comptrollers" to mean the Comptroller of the State of New York and the Comptroller of the State of New Jersey and the officers or board to whom or to which their powers may hereafter appertain.

"Comptrollers."

(5) The word "Engineer" to mean the Chief Engineer of the Commissions or his duly authorized representative or successor.

"Engineer."

(6) The word "Tunnel" to mean that part of the Vehicular Tunnel which the Contractor herein agrees to build under this contract, together with all appurtenances thereto which are to be constructed or provided by the Contractor.

"Tunnel."

(7) The words "Vehicular Tunnel" to mean the whole work connected with the Vehicular Tunnel Project.

"Vehicular Tunnel."

(8) The word "notice" to mean a written notice.

"Notice."

(9) The words "directed," "required," "permitted," "ordered," "designated," "prescribed" or words of like import, used in the specifications or upon the drawings, to mean, respectively, the direction, requirement, permission, order, designation or prescription of the Engineer, and similarly the words "approved," "acceptable," "satisfactory," or words of like import, used in the specifications or upon the drawings, to mean, respectively, approved by, or acceptable or satisfactory to, the Engineer.

"Directions, etc."

(10) The word "Works" to mean all the matters and things herein agreed to be furnished or done by or on the part of the Contractor.

"Works."

(11) The word "ton" to mean the short ton of two thousand (2,000) pounds.

"Ton."



GENERAL PROVISIONS AND DEFINITIONS.

"Mean high water" and datum plane of levels

(12) The words "mean high water" to mean the datum plane of surveys as established by the Commissions, to which vertical distances are referred. "Mean high water" (M.H.W.), elevation 300.00, is two and six hundred fifty-three thousandths (2.653) feet above the "United States Coast and Geodetic Survey" datum, which is "mean sea level" at Sandy Hook, N. J. The figures given in the contract and specifications or upon the contract drawings after the word "elevation" or an abbreviation thereof refer to this "mean high water" datum.

"City."

(13) The word "City" to mean City of Jersey City.

"Inspector."

(15) The word "Inspector" to mean any representative of the Engineer designated by him to act as inspector.

Contractor's address.

ARTICLE IV.—The Contractor hereby designates room number                      on the                      floor of the building number                      in the City of New York, or room number                      on the                      floor of the building number                      in the City of                      , New Jersey, the latter city to be within the counties of Hudson or Essex, as the place where all notices, directions and other communications may be served, mailed or delivered. The delivery at the aforesaid place or deposit in a postpaid wrapper directed to the aforesaid place, in any post office box regularly maintained by the Post Office Department, of any notice, direction or other communication to the Contractor shall be deemed to be sufficient service thereof upon the Contractor as of the date of such delivery or deposit. The said address may be changed at any time by an instrument in writing executed and acknowledged by the Contractor and delivered to the Commissions. Service of any notice, direction or other communication may also be made upon the Contractor personally, or if the Contractor be a corporation, upon any officer or director thereof. The office of the Commissions, until further notice, will be Room 3004 Woolworth Building, 233 Broadway, Borough of Manhattan, New York City.

GENERAL PROVISIONS AND DEFINITIONS.

ARTICLE V.—If the Contractor shall cause any part of this contract to be performed by a subcontractor, the obligations to perform the work under the provisions of this contract shall apply to such subcontractor and his officers, agents and employees in all respects as if he and they were employees of the Contractor; and the Contractor shall not in any manner thereby be discharged from his obligations and liabilities hereunder, but shall be liable hereunder for all acts and negligence of the subcontractor, his officers, agents and employees as if they were employees of the Contractor. The employees of the subcontractor shall be subject to the same provisions hereof as employees of the Contractor; and the work and material furnished by the subcontractor shall be subject to the provisions hereof as if furnished directly by the Contractor.

Liability for acts of subcontractor and his employees.

ARTICLE VI.—The representative of the Commissions on the Works shall be their Chief Engineer or his duly appointed representative or successor who shall direct the work of the Contractor and with whom the Contractor shall deal.

Chief Engineer representative of Commissions.

ARTICLE VII.—The Contractor before ordering any material shall state in writing to the Chief Engineer for approval the name of the person, firm or corporation from whom such material is to be purchased, their place of business and the materials which they are to furnish and such other information as may be required. The Chief Engineer shall have the right to require the Contractor not to place any order for material with any person, firm or corporation disapproved of by him. In the case of subcontracts for a portion of the work, the Contractor shall make a similar statement in writing to the Commissions for approval, and the Commissions shall have the right to require the Contractor not to award subcontracts to any person, firm or corporation disapproved of by them.

Approval of orders for materials and subcontracts.

Assignment  
of contract  
prohibited  
except by  
permission of  
Commissions.

ARTICLE VIII.—The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this contract or of his right, title or interest therein or any part thereof or of his power to execute such contract to any other person, company or corporation without the previous consent in writing of the Commissions; and he shall not assign, whether by power of attorney or otherwise, any of the moneys to become due and payable under this contract unless by and with like consent. If the Contractor shall, without such previous written consent, assign, transfer, convey, sublet or otherwise dispose of this contract or of his right, title or interest therein or any part thereof or his power to execute this contract, or any of the moneys to become due and payable under this contract, to any other person, company or corporation, this contract may, at the option of the Commissions, be revoked and annulled and the States shall thereupon be relieved and discharged from any and all liability and obligations growing out of this contract to the Contractor and to the person, company or corporation to whom he shall assign, transfer, convey, sublet or otherwise dispose of the same, and the said Contractor and his assignee, transferee, or sublessee, shall forfeit and lose all moneys theretofore earned under this contract except so much as may be required to pay his employees; and no right under this contract or to any money to become due hereunder shall be asserted against the States, at law or in equity, by reason of any so-called assignment of this contract or any part thereof or of any moneys to grow due hereunder unless authorized as aforesaid by the written consent of the Commissions; provided that nothing herein contained shall be construed to hinder, prevent or affect an assignment by the Contractor for the benefit of his creditors made pursuant to the laws of the State of New York or the laws of the State of New Jersey.

Labor law  
and workmen's  
compensation.

ARTICLE IX.—The Contractor agrees to comply with the provisions of any laws of the State of New York and



of the State of New Jersey relative to the compensation, hours of labor, conditions of employment of any laborer, workman, or mechanic employed by him, and especially Chapter 36 of the Laws of 1909, State of New York, and Chapter 95 of the Laws of 1911, State of New Jersey, so far as the said laws may be applicable thereto.

The Contractor agrees to abide by any rule or order of any board or official authorized or directed by law to enforce provisions of any law of the State of New Jersey relating to hours of labor, or conditions of employment of any laborer, workman, or mechanic employed by him hereunder.

Labor laws,  
etc.

ARTICLE X.—Each and every provision of law required to be inserted in this contract should be, is and is deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then this contract shall forthwith, upon the application of either party, be amended by such insertion so as to comply strictly with the law without prejudice to the rights of either party hereunder.

Provisions  
deemed  
inserted.

ARTICLE XI.—If this contract contains any unlawful provision not an essential part of the general structure of the contract and which shall not appear to have been a controlling or very material inducement to the making thereof, the same shall be deemed of no effect and shall, upon the application of either party, be stricken from this contract without affecting the binding force of the contract as it shall remain after omitting such provision.

Unlawful  
provisions  
void.

ARTICLE XIII.—No claim shall be made by the Contractor against any member, officer, agent or employee of the Commissions personally, under or by reason of this contract or any matter arising therefrom or any of its articles or provisions or of anything ordered or required hereunder.

Members or  
employees of  
Commissions  
not personally  
liable.

### CHAPTER III.

#### WORK TO BE DONE, PRICES, ETC.

Work to  
be done.

ARTICLE XIV.—The Contractor shall furnish all the labor and materials, plant, power, tools, equipment, supplies and other means of construction necessary or proper for the excavation and construction of the Tunnel in the manner and within the time hereinafter specified. He shall complete the excavation and construction of the Tunnel and do all work and furnish all labor and materials in and about such excavation and such construction to the satisfaction of the Commissions and in accordance with the plans, contract and specifications and at the prices herein agreed upon and fixed therefor; provided, however, the contract drawings may from time to time be altered or modified as hereinafter provided. There are included within his obligation under this Article, as essential features thereof, the provision of plant adequate in all respects to insure the progress of the Tunnel according to the best rules and usages of such work; the employment of methods best adapted to avoid damage to adjacent structures and other property; and the requirement that the Tunnel when completed shall be water-tight.

Incidental  
work in-  
cluded.

ARTICLE XV.—The work which is to be done under this contract includes the protection, support and maintenance, and when necessary the underpinning of adjacent and abutting buildings and tanks; the protection, support and maintenance of railroad tracks and railroad structures, including railroad tunnel structures, sewers, pipes, ducts, conduits, cables, vaults of buildings and all other surface, subsurface and overhead structures or works of other persons or contractors with their connections and other appurtenances; the maintenance of traffic on streets, railroads, and other avenues of traffic; and the performance of all such additional and incidental work as may be necessary for the completion of said Tunnel and

the restoration, including where necessary the reconstruction of all surface, subsurface and overhead structures which may have been directly or indirectly affected, disturbed or injured by the Contractor to as useful, safe, desirable and good a condition as existed before construction was begun.

ARTICLE XVI.—The States shall pay, and the Contractor shall receive, in full compensation for the excavation and the construction of the Tunnel and for all expenses in connection therewith or incidental thereto, including the furnishing of all labor, materials, plant, power, tools, appliances, equipment and supplies, and for all loss and damage arising out of the nature of the work aforesaid or from the action of the elements or from any unforeseen obstruction, difficulty or delay encountered in the prosecution of the work and for all risks of any description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, the prices contained in the following Schedule.

Payment to  
Contractor.

SCHEDULE OF PRICES.

SCHEDULE ITEMS.

EXCAVATION.

Item 2.—For excavation, above mean high water, the  
sum of  
dollars (\$ )  
per cubic yard.

Item 3.—For excavation, below mean high water, except  
caisson excavation, the sum of  
dollars (\$ )  
per cubic yard.

Item 5.—For caisson excavation, the sum of  
dollars (\$ )  
per cubic yard.

MASONRY.

Item 27.—For concrete as follows:

(d) For concrete, the sum of  
dollars (\$ )  
per cubic yard.

(g) For pre-cast concrete forms, the sum of  
dollars (\$ )  
per square foot.

Item 29.—For mortar batches used in connection with  
placing concrete, the sum of  
dollars (\$ )  
per barrel of cement used.

Item 34.—For brick masonry, the sum of  
dollars (\$ )  
per cubic yard.



SCHEDULE OF PRICES.

Item 36.—For granite curbing for tunnel roadway, the  
sum of  
dollars (\$) )  
per lineal foot.

Item 37.—For hollow terra cotta tile, the sum of  
dollars (\$) )  
per cubic yard.

PILES.

Item 53.—For timber piles, the sum of  
dollars (\$) )  
per lineal foot.

TIMBER CRADLES.

Item 59.—For timber cradle to support sewers, the sum of  
dollars (\$) )  
per thousand (1,000) feet board measure.

WATERPROOFING.

Item 60.—For waterproofing, treated woven fabric laid  
with asphalt as follows:

(b) For two (2) ply, the sum of  
dollars (\$) )  
per square yard.

(c) For three (3) ply, the sum of  
dollars (\$) )  
per square yard.

(d) For four (4) ply, the sum of  
dollars (\$) )  
per square yard.

(e) For five (5) ply, the sum of  
dollars (\$) )  
per square yard.

SCHEDULE OF PRICES.

- (f) For six (6) ply, the sum of  
dollars (\$) )  
per square yard.

Item 62.—For waterproofing, brick laid in asphalt mastic, including one (1) ply treated woven fabric, the sum of  
dollars (\$) )  
per cubic yard.

STEEL AND IRON.

Item 70.—For built-up and miscellaneous steel work, as follows:

- (a) For built-up steel work and tie rods, the sum of  
dollars (\$) )  
per ton.

- (b) For bolts including anchor bolts and such miscellaneous malleable iron castings and wrought-iron fixtures, including ladders and hand bars, either in the Tunnel or in sub-surface structures (but not including pipe) as are not specifically provided to be paid for in other classified unit items, the sum of  
dollars (\$) )  
per ton.

Item 72.—For steel beams and shapes, with or without connections, the sum of  
dollars (\$) )  
per ton.

Item 73.—For steel rods and bars for reinforcing concrete, the sum of  
dollars (\$) )  
per ton.

SCHEDULE OF PRICES.

Item 74.—For wire mesh, the sum of  
dollars (\$) )  
per ton.

Item 75.—For special steel structures, as follows:

(f) For air duct manhole frames with covers complete, the sum of  
dollars (\$) )  
each.

(g) For furnishing new riveted steel pipe sewers required, the sum of  
dollars (\$) )  
per ton.

Item 77.—For copper steel, as follows:

(a) For plates, bolts, nuts and washers, the sum of  
dollars (\$) )  
per ton.

Item 81.—For furnishing and placing new wrought-iron or steel pipe and pipe fittings in the Tunnel, or as required for subsurface changes, except pipe for electric conduits, the sum of  
dollars (\$) )  
per pound.

Item 85.—For galvanized iron electric conduits in the Tunnel, as follows:

(a) For three-quarter ( $\frac{3}{4}$ ) inch conduits, the sum of  
dollars (\$) )  
per lineal foot.

(b) For one (1) inch conduits, the sum of  
dollars (\$) )  
per lineal foot.

SCHEDULE OF PRICES.

- (d) For one and one-half ( $1\frac{1}{2}$ ) inch conduits, the  
sum of  
dollars (\$) )  
per lineal foot.
- (e) For two (2) inch conduits, the sum of  
dollars (\$) )  
per lineal foot.
- (f) For two and one-half ( $2\frac{1}{2}$ ) inch conduits, the  
sum of  
dollars (\$) )  
per lineal foot.
- (g) For three (3) inch conduits, the sum of  
dollars (\$) )  
per lineal foot.
- (h) For four (4) inch conduits, the sum of  
dollars (\$) )  
per lineal foot.

Item 86.—For miscellaneous galvanized iron fixtures, as follows:

- (a) For outlet boxes ( $3\frac{1}{2}$ " x  $3\frac{1}{2}$ " x  $1\frac{1}{2}$ ") in the tunnel, the sum of  
dollars (\$) )  
each.
- (b) For pull boxes (4" x 4" x 3") in the tunnel, the  
sum of  
dollars (\$) )  
each.
- (c) For pull boxes (6" x 10" x 4") in the tunnel, the  
sum of  
dollars (\$) )  
each.



SCHEDULE OF PRICES.

- (d) For pull boxes (8" x 12" x 4") in the tunnel,  
the sum of  
dollars (\$) )  
each.
- (e) For curb guards, ladders, hand bars and miscellaneous fixtures, the sum of  
dollars (\$) )  
per pound.
- (f) For pull boxes (12" x 24" x 6") in the tunnel,  
the sum of  
dollars (\$) )  
each.
- (g) For boxes for lights in the tunnel, the sum of  
dollars (\$) )  
each.

CAST IRON.

- Item 91.—For furnishing new cast-iron hub and spigot pipe, straight pipe, required for subsurface changes, the sum of  
dollars (\$) )  
per ton.
- Item 92.—For furnishing new cast-iron hub and spigot pipe, special castings, required for subsurface changes, the sum of  
dollars (\$) )  
per ton.
- Item 95.—For miscellaneous cast-iron fixtures required, as follows:
- (a) For new manhole and catch basin fixtures, gratings, drain covers and castings not otherwise provided for, not including pipe or pipe fittings, the sum of  
dollars (\$) )  
per ton.

SCHEDULE OF PRICES.

- (b) For cast-iron exhaust air ports Type A-6, the  
sum of  
dollars (\$) )  
each.
- (c) For cast-iron exhaust air ports Type E-3, com-  
plete, the sum of  
dollars (\$) )  
each.

Item 100.—For cast-iron water, discharge or other tun-  
nel service pipe, as follows:

- (a) For four (4) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.
- (b) For six (6) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.
- (c) For eight (8) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.
- (d) For ten (10) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.
- (e) For twelve (12) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

BRONZE AND BRASS.

Item 108.—For bronze and brass fixtures, as follows:

- (a) For miscellaneous bronze fixtures, the sum of  
dollars (\$) )  
per pound.
- (b) For miscellaneous brass fixtures, the sum of  
dollars (\$) )  
per pound.

SCHEDULE OF PRICES.

LEAD.

Item 109.—For lead, as follows:

- (a) For sheet lead for waterproofing and flashing,  
the sum of  
dollars (\$) )  
per pound.

TUNNEL DUCTS.

Item 110.—For tunnel ducts, as follows:

- (a) For single way ducts, the sum of  
dollars (\$) )  
per duct foot.
- (b) For two way ducts, the sum of  
dollars (\$) )  
per duct foot.
- (c) For three way ducts, the sum of  
dollars (\$) )  
per duct foot.
- (d) For four way ducts, the sum of  
dollars (\$) )  
per duct foot.
- (e) For six way ducts, the sum of  
dollars (\$) )  
per duct foot.
- (f) For four (4) inch fiber ducts, the sum of  
dollars (\$) )  
per duct foot.

ASBESTOS MATERIALS.

Item 112.—For asbestos materials and compounds, as follows:

- (a) For one-quarter ( $\frac{1}{4}$ ) inch asbestos lumber, the  
sum of  
dollars (\$) )  
per square foot.

SCHEDULE OF PRICES.

SUBSURFACE WATER PIPE AND GAS PIPE CHANGES.

Item 120.—For changing cast-iron water pipe to avoid interference with the Tunnel, but not furnishing new pipe required, as follows:

(a) For pipe four (4) inches or under, the sum of  
dollars (\$ )  
per lineal foot.

(b) For six (6) inch pipe, the sum of  
dollars (\$ )  
per lineal foot.

(d) For ten (10) inch pipe, the sum of  
dollars (\$ )  
per lineal foot.

Item 122.—For changing gas pipe to avoid interference with the Tunnel, but not including furnishing new pipe required, as follows:

(a) For four (4) inch pipe, the sum of  
dollars (\$ )  
per lineal foot.

(b) For six (6) inch pipe, the sum of  
dollars (\$ )  
per lineal foot.

SUBSURFACE ELECTRIC DUCT AND CONDUIT CHANGES.

Item 126.—For changing creosoted wood conduits to avoid interference with the Tunnel including furnishing new conduits required, as follows:

(a) For two (2) inch conduit, the sum of  
dollars (\$ )  
per lineal foot.

SEWER CHANGES.

Item 130.—For laying vitrified pipe sewers, including furnishing new pipe required, as follows:



SCHEDULE OF PRICES.

(b) For six (6) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

(c) For twelve (12) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

(f) For eighteen (18) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

Item 133.—For laying cast-iron pipe sewers but not including furnishing new pipe required, as follows:

(b) For six (6) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

(c) For eight (8) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

Item 134.—For changing steel pipe sewers, but not including furnishing new pipe required, as follows:

(a) For sixty (60) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

(b) For sixty-six (66) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

(c) For ninety-six (96) inch pipe, the sum of  
dollars (\$) )  
per lineal foot.

SCHEDULE OF PRICES.

FENCING.

Item 155.—For building tight board fence, the sum of  
dollars (\$ )  
per lineal foot.

RESTORATION OF SURFACE.

Item 164.—For restoration of pavement, as follows:

(a) For stone block pavement, the sum of  
dollars (\$ )  
per square yard.

Item 166.—For restoration of curbing, the sum of  
dollars (\$ )  
per lineal foot.

SCHEDULE OF PRICES.

Item 300. For any work or materials which shall be required to be done or furnished in or about the Works which it is elsewhere in this contract expressly provided shall be paid for under this Item, or

Work not susceptible of classification.

For any work or materials which shall be required to be done or furnished in or about or for the more perfect performance of the Works which are not mentioned, specified, or indicated, or otherwise provided for in this contract and which, in the opinion of the Engineer, are not susceptible of classification under the foregoing Items of the Schedule:

The Contractor shall, if ordered in writing, do and perform such work and furnish such materials at and for the actual necessary net cost in money to the Contractor for labor, for insurance upon such labor under the Workmen's Compensation Law, and for materials incorporated in the work, and in addition thereto fifteen per centum (15%) of such net cost.

Work to be performed at net cost and in addition 15%.

The Contractor shall have no claim in excess of the above, such payment being in full compensation for the performance of such work and the furnishing of such materials and for all expense in connection therewith or incidental thereto as aforesaid, including the expense of plant, power, tools, supplies and other means of construction, administration, superintendence, and insurance, and for all the loss, damage, risks and expenses hereinbefore mentioned in the first paragraph of this Article.

No claim in excess.

The amount of the insurance upon labor under the Workmen's Compensation Law shall be determined by the amount of wages actually and necessarily paid for such labor and the rate of insurance for such labor paid by the Contractor either in the New York State Insurance Fund, or in any stock corporation or mutual association authorized to transact the business of workmen's compensation insurance in the State of New York or the State of New Jersey as may be required by law in either or

Insurance upon labor.

SCHEDULE OF PRICES.

both states, as the case may be. If the Contractor shall not have insured either in such New York State Insurance Fund or in any such stock corporation or mutual association, the rate allowed will be the rate which he would have been required to pay for such insurance in the New York State Insurance Fund had he insured therein or at the rate determined by the Compensation Rating and Inspection Board of New Jersey, as the case may be.

No payment  
under this  
Item for work  
susceptible  
of classifica-  
tion under  
other Items.

Payment shall not be made under this Item for any such work or materials which are so required to be done or furnished in or about or for the more perfect performance of the Works and which are not mentioned, specified, or indicated, or otherwise provided for in this contract, so far as such work or materials may be, in the opinion of the Engineer, susceptible of classification under the other Items of the Schedule, but such work or materials shall be paid for in part or in whole, as the case may be, at the unit prices given in such other Items of the Schedule.

Daily reports  
required.

If any work or materials shall be required to be done or furnished under this Item, for cost plus fifteen per centum (15%), the Contractor shall, at the end of each day, furnish to the Engineer daily time slips showing the name and number of each workman employed on such work, the number of hours employed thereon, the character of work done and the wages paid or to be paid to him, the rate and amount of workmen's compensation insurance and also a daily memorandum of such materials furnished, showing the amount and character of such materials, from whom purchased and the amount paid or to be paid therefor. If required by the Commissions or the Engineer, the Contractor shall produce any books, vouchers, records and memoranda showing the labor and materials actually paid for and the actual prices therefor. Such daily time slips and memoranda shall not, however, be binding upon the States, and if any



SCHEDULE OF PRICES.

question or dispute shall arise as to the correct cost of such labor or materials, the determination of the Engineer upon such question or dispute shall be final and conclusive.

Instead of the method above described for paying for any such work or materials under this Item, the Engineer may, but only with the approval of the Commissions, agree with the Contractor upon reasonable unit prices or a reasonable lump sum price for such work and materials. Such additional unit prices or such lump sum price shall be included under this Item (Item 300) as a supplemental schedule.

Prices may  
be fixed by  
agreement.

QUANTITIES.

QUANTITIES.

Quantities  
only for  
purpose of  
comparing  
bids.

ARTICLE XVII.—The estimated quantities of the various classes of work to be done and materials to be furnished under this contract specified in the Contractor's proposal are only for the purpose of comparing, on a uniform basis, the bids offered for the Works; and neither the States nor the Commissions nor any member of the Commissions assume responsibility for even the approximate correctness of the said estimated quantities and the Contractor shall not make or have any claim for damages or for anticipated profit or for loss of profit or otherwise because of any difference between the quantities of the various classes of work actually done and the estimated quantities of the items stated in the Contractor's proposal or because of the entire omission thereof in such proposal.

Commissions  
may amplify  
drawings.

ARTICLE XVIII.—The Commissions shall have the right during the progress of the work to amplify the drawings, to add explanatory specifications and to furnish additional drawings.

Commissions  
may change  
location.

ARTICLE XIX.—The Commissions expressly reserve the right to change the location of the Tunnel in any way that they may deem necessary for the public interest, and to alter the drawings aforesaid in any part or altogether at any time during the progress of the work. Such changes or alterations shall not constitute grounds for any claim by the Contractor for payment or allowance for damages or extra service other than is provided for in the different classes of construction under the schedule items of this contract, and for a reasonable extension of the contract time.

Contractor  
bound to  
complete  
in best  
manner.

ARTICLE XX.—The Contractor shall complete all work in accordance with the plans and specifications and according to the other provisions of this contract and within the time specified in this contract in the most workman-

INSPECTION.

like manner and with the highest regard for the safety of life and property and according to the directions given by the Engineer.

ARTICLE XXI.—All labor, materials, plant, tools, appliances, equipment and supplies necessary to complete all work covered by the specifications and provisions of this contract, shall be furnished by the Contractor and shall be of the best character, each of its kind.

Best labor,  
etc., to be  
furnished.

INSPECTION.

ARTICLE XXII.—The Commissions contemplate, and the Contractor approves, the most thorough and minute inspection at all times by the Commissions and their Engineer and by their representatives or subordinates of all work to be done and of all materials to be furnished under this contract and of the manufacture or preparation of such materials. It is the intention of the Commissions that their Engineer shall draw the attention of the Contractor to all defects in workmanship or materials or other errors or variations from the requirements of this contract, but no omission on the part of the Commissions or their Engineer or any of their representatives or subordinates to discover or point out such errors, variations or defects, shall give the Contractor any right or claim against the States or shall in any way relieve the Contractor from his obligations according to the terms of this contract.

Inspection.

ARTICLE XXIII.—The Contractor shall at all times give to the Commissions and their members, to the Engineer and his assistants and to any person designated by the Commissions all facilities, whether necessary or convenient, for inspecting the work to be done and materials to be furnished under this contract. The Contractor shall furnish without additional expense specimens and certified copies of physical and chemical tests of all materials furnished, as required by the Engineer. The members of the Commissions, the Engineer and his assistants and all

Contractor  
to afford  
facilities for  
inspection.

persons bearing the authorization of the Commissions shall be admitted at any time summarily and without delay to any part of the Works or to inspection of materials at any place.

Uncovering  
finished  
work.

ARTICLE XXIV.—The Commissions or their Engineer shall be furnished by the Contractor with every reasonable facility for ascertaining whether the work is in accordance with the requirements and intention of this contract, even to the extent of uncovering or taking down portions of finished work. Should the work thus exposed or examined prove satisfactory, the uncovering or taking down and the replacing of the covering or the making good of the parts removed shall be paid for at the contract prices for the class of work done; but should the work exposed or examined prove unsatisfactory, such uncovering, taking down, replacing and making good shall be at the expense of the Contractor.

Inspection  
not to relieve  
Contractor.

ARTICLE XXV.—The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill this contract as herein prescribed, and defective work shall be made good and unsuitable materials will be rejected even though such work and materials may have been previously accepted or estimated for payment. If the work or any part thereof shall be found defective before the final completion and acceptance of the Works, the Contractor shall forthwith make good such defects in a manner satisfactory to the Engineer, and if any material selected or brought upon the ground for use in the work shall be condemned by the Engineer as unsuitable or not in conformity with the plans and specifications, the Contractor shall forthwith remove such materials.

Acceptance  
not to relieve  
Contractor.

ARTICLE XXVI.—No acceptance of any part of the Works or of materials therefor shall relieve the Contractor of his obligation to furnish sound material and perform sound work, whether with respect to such part or to any other part of the Works.

Engineer's  
determination.

ARTICLE XXVII.—To prevent disputes and litigations the Engineer shall in all cases determine the classifica-



FACILITIES FOR OTHER CONTRACTORS.

tion for payment and the amount, quality, acceptability and fitness of the several kinds of work and materials which are to be performed or furnished under this contract, shall determine every question in relation to the Works and the performance thereof and every question which may arise relative to the fulfillment of this contract on the part of the Contractor. His determination and estimate shall be final and conclusive upon the Contractor, and if any question touching this contract shall arise between the parties hereto, such determination and estimate shall be a condition precedent to the right of the Contractor to receive any money under this contract.

FACILITIES FOR OTHER CONTRACTORS.

ARTICLE XXVIII.—The Engineer shall make all necessary explanations as to the meaning and intention of the specifications, shall give all orders and directions contemplated therein or thereby and in every case in which a difficult or unforeseen condition shall arise in the performance of the work required by this contract.

Engineer's  
explanation. ]

The Contractor shall promptly obey and follow every direction which shall be given by the Engineer, including any direction which the Engineer shall give by way of withdrawal, modification or reversal of any previous direction given by him.

Contractor  
to obey  
directions of  
Engineer.

During the progress of the work under this contract it will be necessary for other contractors and persons employed by the States to do work in or about the Vehicular Tunnel, including but not limited to the construction of ventilation buildings, laying of pavement, drawing cables, installing wires for lighting and applying certain finish to the tunnels. The Commissions reserve the right to put such other contractors and persons to work and to afford them access to their work across the site of the work to be performed hereunder at such time and in such manner as the Commissions may in their discretion deem proper.

Relation  
to other  
contractors.

DRAWINGS.

Prosecution  
of work in  
relation to  
other Con-  
tractors.

The Contractor shall prosecute his work continuously and diligently and shall keep his work so advanced that the Commissions will be enabled to proceed with the above mentioned work, and any other work to be performed under other contracts. The Contractor shall so conduct his work as not to impede or interfere with the work of such other contractors or persons and shall so arrange his work that such other contractors and persons may expeditiously complete their work in order that the Vehicular Tunnel may be put in operation at the earliest possible date and for that purpose the Contractor herein shall afford to such other contractors or persons such facilities as the Commissions may require.

Engineer  
to decide  
disputes.

Wherever any work performed or to be performed by the Contractor under this contract shall adjoin or affect any work performed or to be performed by any other contractor or contractors of the Commissions, including tunnel construction within fifty (50) feet of the division lines between this contract and adjacent contracts, and the changing or relaying of surface or sub-surface structures to such a distance beyond this contract as will include their complete restoration as hereinafter provided, the Engineer shall decide any question or dispute between the Contractor and such other contractor or contractors and shall determine which of them shall perform or complete any work within the limits mentioned above and the manner, time and method in which they shall perform their respective work and the facilities which each shall afford to the other or others, and his determination shall as aforesaid be final and conclusive upon the Contractor.

DRAWINGS.

Specifications  
and drawings  
explanatory of  
each other.

ARTICLE XXIX.—The specifications do not include all requirements, but are requirements in addition to those elsewhere given or provided in this contract. The specifications and the other provisions of this contract and the contract drawings are intended to be explanatory of one

DRAWINGS.

another. Should, however, any discrepancy appear or any misunderstanding arise as to the import of anything contained in either, the explanation or decision of the Engineer shall be final and conclusive. In all drawings, dimensions expressed by figures are to be used instead of scaled dimensions.

ARTICLE XXX.—The contract drawings referred to in this contract and in the specifications bear the general title:

Contract drawings.

NEW YORK STATE  
BRIDGE AND TUNNEL COMMISSION  
AND  
NEW JERSEY INTERSTATE  
BRIDGE AND TUNNEL COMMISSION

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HUDSON RIVER VEHICULAR TUNNEL

CONTRACT NO. 6

CONTRACT DRAWING NO. . . . .

These drawings are numbered from 1 to 35, inclusive, dated September 10, 1924, and countersigned by the Chief Engineer.

ARTICLE XXXI.—In addition to the contract drawings already mentioned, the Commissions have had prepared a set of drawings bearing the same general title as the contract drawings, but designated *Supplementary Drawings*. These supplementary drawings exhibit certain information which the Commissions have received from their Engineer of the general nature of the soil underlying portions of the work, the material through which the tunnels will pass, the nature and position of railroads, railroad tunnel structures, oil tanks, water mains, gas

Supplementary drawings.

DRAWINGS.

and other pipes, sewers, manholes, hydrants, catch basins and other surface, sub-surface and overhead structures.

Supplemen-  
tary drawings  
not guar-  
anteed.

ARTICLE XXXII.—These supplementary drawings are furnished to the Contractor without any representations or guarantee on the part of the Commissions as to their completeness or correctness. If in the prosecution of the work difficulties of any nature be encountered which are not indicated or suggested by the supplementary drawings, or if additional surface, sub-surface or overhead structures or other works or obstructions be found of different size or in different positions or of different nature from those shown on the supplementary drawings or if in any other way such supplementary drawings be found erroneous, incomplete or misleading, the Contractor shall take every necessary or proper precaution to overcome the unforeseen difficulty and to properly construct the Tunnel under such conditions and shall protect, support, maintain, shift, relay, reconstruct or rebuild the additional or different surface, sub-surface or overhead structures or other works as required.

Borings not  
guaranteed.

In addition to the supplementary drawings referred to above, samples of materials taken in connection with test borings may be seen in the office of the Commissions; but as in the case of the supplementary drawings, there are no representations or guarantee on the part of the Commissions as to their completeness or correctness.

Contractor has  
examined  
location,  
drawings, etc.

ARTICLE XXXIII.—The Contractor hereby represents that prior to the execution of this contract, he has examined in detail on the ground the location of the work mentioned herein and indicated on the contract drawings and that he has fully examined the contract drawings and has read each and every clause and section of this contract and of the specifications and has had full opportunity to consider the same and make necessary investigations relating thereto; and he shall not make any claim for or have any right to damages or an ex-



tension of time for completion of the Works or any other concession because of any misinterpretation or misunderstanding of this contract or of the specifications or of the drawings or because of any lack of information.

## CHAPTER IV.

### SPECIFICATIONS.

1. The general clauses of the specifications are grouped under different subdivisions and the requirements as to specific kinds of work under different items.

### BRIEF DESCRIPTION OF THE WORK.

2. The work to be done under this contract consists of constructing two (2) tunnels beginning about one thousand (1,000) feet west of the river bulkhead in the Erie Railroad Yard, Jersey City, and extending in a westerly direction; the north tunnel terminating at grade in Fourteenth Street at the east side of Provost Street and the south tunnel terminating at grade in Twelfth Street at the east side of Provost Street. The work also includes the construction of air ducts with their foundations, the foundations for the ventilation building, and the reconstruction and relocation of sewers in Twelfth, Thirteenth, Fourteenth, Provost Streets and the Delaware, Lackawanna and Western Railroad Yard.

Location  
of work.

3. The tunnel structure in general is to be of steel and concrete construction, with such facilities and such finish as are hereinafter specified.

Type of  
structure.

4. The tunnels are to be built from the surface without disturbance to adjacent structures. The Contractor will be required to maintain throughout his work all facilities for adjacent buildings and for the uninterrupted operation of trains on the adjacent tracks of the Erie Railroad, the Delaware, Lackawanna and Western Railroad and the Hudson and Manhattan Railroad, and to so conduct his work as to assure the safety of the public and cause a minimum of interference with the work of other contractors engaged in tunnel construction.

Method of  
construction.

Incidental  
work included.

5. The work to be done under this contract includes the performance of certain incidental work which is generally referred to in Article XV.

GENERAL CLAUSES.

SUBDIVISION 1—METHOD OF PROSECUTING THE WORK.

Manner of  
prosecution

6. All the work shall be prosecuted in the manner, according to conditions, best calculated to promote rapidity in construction, to secure safety to life and property, and to reduce to a minimum any interference with train operations in the railroad yards, or in tunnel structures. The periods of occupancy of certain sites are given on the drawings. These periods are limited on account of the work being prosecuted in railroad terminal yards, where it is of the greatest importance that interference with railroad operations be minimized. The site for the construction of the air ducts cannot be made immediately available to the Contractor, as this site is now necessary for the prosecution of work under another contract. The Contractor will be put in possession of the different sites as herein elsewhere set forth and will be required to prosecute the work in such a manner as to insure the completion of the work within the contract time.

Contractor to  
comply with  
reasonable  
requirements.

7. The Contractor shall comply with the reasonable requirements of the Erie Railroad Company, the Delaware, Lackawanna and Western Railroad Company and the Hudson and Manhattan Railroad Company relative to fencing, lighting and protecting property in order that railroad operations adjacent to the work may be properly safeguarded.

Work to be  
continuous in  
emergencies.

8. In case of emergencies involving danger to life or property, or where the integrity of the work requires a continuous operation, work with an increased force may be ordered by the Engineer for such time as may be necessary.

9. The Contractor shall conduct his operations diligently in all parts of the work, co-ordinating the different parts so that the completion of each part as well as the entire work shall not be unnecessarily delayed and so that there shall be no interference, delay or danger to other contractors of the Vehicular Tunnel project. Work is to be commenced and maintained under the orders and directions and to the full satisfaction of the Commissions or their Engineer.

Work to be diligent in all parts.

10. The Tunnel built under this contract forms a part of the Hudson River Vehicular Tunnel, which the interests of the States imperatively require shall be completed and put in operation without delay. The Contractor shall prosecute his work in such manner as to make it reasonably probable, in the judgment of the Engineer, that the work will be completed within the time limited therefor. The Contractor, if directed by the Engineer, shall rearrange the work and increase the number of shifts and the number of men in each shift to the extent that may be necessary to insure the completion of the work within the time required by this contract.

Engineer may order working shifts increased.

11. The Contractor shall furnish plant and other means of construction adequate for the prosecution of the work at a rate of progress which, in the judgment of the Engineer, will secure the completion of the work within the time herein limited therefor. If at any time the plant or any portion of it shall appear to the Engineer to be or likely to become inadequate, incomplete or faulty, the Contractor shall promptly obey the orders of the Engineer to supplement or to remove and replace the same; but the failure of the Engineer to issue such orders shall not relieve the Contractor of his responsibility for the adequacy and safe operation of the plant.

Contractor's plant.

12. No work shall be begun until the Commissions shall issue to the Contractor an order directing him to

Order to begin work.

proceed. The order shall be in such form and shall cover such portions of the work as the Commissions shall prescribe.

Permission  
to start  
excavation.

Excavation will not be permitted until the Contractor has given satisfactory assurances that the materials for construction will be available when needed. The Contractor must conduct his work so as to avoid advancing the excavation at any place ahead of the delivery on the work or on the property owned or leased by the States of the structural iron and steel required for such place, unless otherwise permitted by the Engineer. Before any opening is made in a street or on railroad property a copy of the order issued by the Commissions directing the Contractor to proceed with the work shall have been filed with the proper authorities or owners.

Notice of  
intention to  
commence  
work.

13. The Contractor, at least one (1) week before commencing work at any point, shall give notice in writing to the Commissions of his intentions to commence such work, and if required by the Engineer shall submit plans for approval showing the methods contemplated in carrying out this particular work. The Contractor shall also, at least two (2) weeks before commencing or resuming manufacture of any article called for by these specifications, give notice in writing to the Engineer of his intention to commence or resume such manufacture, with the name and address of the manufacturer and the amount and description of the material to be manufactured.

Plant to  
be approved.

14. Drawings showing the location and construction of the Contractor's plant shall be submitted to the Engineer and must receive his approval before permission will be granted for their construction; but the approval by the Engineer of such drawings shall not relieve the Contractor of responsibility for injury to persons or damage to property.



16. Whenever the construction of the Tunnel shall interfere with, disturb or endanger any sewer, water pipe, gas pipe, oil tank, railroad, tunnel, or other surface, sub-surface or overhead structure, the work of construction at such points including any necessary underpinning shall be conducted as approved by the Engineer in accordance with the reasonable requirements of the owners.

Work to be approved by Engineer.

The Contractor shall, at his own expense, procure all permits necessary or requisite for doing the above described work as required by the Engineer.

Contractor to procure permits.

17. The Engineer will prepare and furnish to the Contractor during the progress of the work drawings in amplification or modification of the contract drawings and drawings showing the adjustment and reconstruction of all surface, sub-surface and overhead structures wherever the reconstruction of the same is necessitated by the construction of the Tunnel. The Contractor shall promptly, upon the delivery of this contract, furnish a written statement to the Engineer showing the order in which he desires the drawings to facilitate the prosecution of his work and this order will be followed so far as reasonably practicable and necessary. The first of these drawings will be given to the Contractor within thirty (30) days after this statement is received and the remainder from time to time, as may be reasonably and necessarily required by the Contractor, except that detail drawings for changes in sub-surface structures shall be furnished within a reasonable time after such structures are uncovered. The Contractor may, but only with the written consent of the Engineer, make changes in said written statement furnished to the Engineer showing the order in which the Contractor desires the drawings, but the Contractor shall be responsible for any delay resulting from any such changes and no extension of time or other allowance or concession will be made to the Contractor on account of any such change or any

Drawings.

delay resulting therefrom. Where, however, changes are deemed necessary, they may be ordered under Article XVIII of this contract by the Engineer, who shall issue such drawings as may be necessary.

Working  
or shop  
drawings.

The Contractor shall make all working or shop drawings which may be required in addition to the contract drawings or in addition to such other drawings as the Engineer may issue in amplification or modification of the contract drawings. All working or shop drawings shall be submitted in duplicate to the Engineer for his approval, which approval will be indicated by his countersigning one set of such working or shop drawings and returning the same to the Contractor. Should the working or shop drawings be not approved by the Engineer, then the Engineer will return one set of such working or shop drawings, with the necessary corrections and changes indicated thereon; the Contractor shall make such corrections and changes and again submit drawings in duplicate for the approval of the Engineer; and no work called for by said working or shop drawings shall be done until the approval of the Engineer shall be obtained, which approval will be given or refused within twenty (20) working days after delivery to him at his office of such drawings in duplicate. The Engineer's approval shall not relieve the Contractor of any responsibility for errors that occur in such drawings. Immediately upon final approval of such working or shop drawings by the Engineer, the Contractor shall furnish the Commissions with five (5) additional copies of such approved drawings. The tracings of all the approved working or shop drawings made by the Contractor shall be delivered to and become the property of the Commissions prior to or upon the completion of the particular work covered by these drawings.

Orders to  
superinten-  
dent, overseer  
or foreman.

18. Orders and directions may be given orally by the Engineer to, and shall be received and promptly obeyed by the Contractor or his representative or any superin-

tendent, overseer or foreman of the Contractor who may have charge of the particular work in relation to which the orders or directions are given, and a confirmation in writing of such orders or directions will be given to the Contractor by the Engineer if so requested. The Contractor or his duly authorized representative shall be present at all times on the work to receive orders and directions from the Engineer. The Contractor shall also maintain, during the performance of the work, an office in Jersey City in the vicinity of the work, at which he or his duly authorized representative shall be present at all times. Orders or directions, written or oral, from the Engineer delivered at said office shall be considered as delivered to the Contractor. Copies of the contract, including the specifications, and of the drawings for the work shall be kept at said office ready for use at any time.

19. The Contractor must not allow waste material of any kind to remain on the streets or to accumulate on the work, but he must cart away all such material and dispose of it as hereinafter provided at his own expense. The Contractor shall also at his own expense keep the work, streets, thoroughfares, railroad property and all public places occupied by him clear of all refuse and rubbish and leave them in a neat condition; but this is not to be construed as placing upon the Contractor the usual duties of the Street Cleaning Department.

Waste  
material.

20. The Contractor shall, at his own expense, provide for the water supply necessary for the work and he shall bear the expense of any connection, inspection, meter or other charge resulting therefrom.

Water supply.

21. Sanitary conveniences, properly secluded from public observation, and of a form approved by the Engineer shall be constructed and maintained by the Contractor at his own expense, for the use of his employees.

Sanitary  
conveniences.

22. The Contractor, at his own expense, shall provide neat substantial fences, approved by the Engineer, around

Fences to  
be provided  
around work.

his plant and around all openings wherever required for the protection of the work, adjacent property or the public.

Temporary structures to be lighted.

Whenever by reason of conditions created by the Contractor in connection with his temporary structures illumination by artificial means becomes necessary in order to protect persons and property, as well as to prevent the commission of nuisances, the Contractor shall furnish and maintain necessary lights for proper illumination.

Openings to be guarded.

Any openings temporarily unfenced and surface obstructions shall be guarded and shall be indicated at night by suitable and sufficient lights.

Temporary structures to be painted.

All temporary structures and fences erected by the Contractor shall be neat in appearance and shall be painted as directed by the Engineer.

Advertisements not permitted.

The Contractor shall not place or permit the placing of any advertising matter, other than the name and address of the Contractor, upon fences, buildings or any part of the work or plant or materials.

Competent men.

23. The Contractor shall employ competent, skillful and faithful men to do the work, and for special work requiring skill along any particular line, men especially skilled in such line shall be employed. Whenever the Engineer shall notify the Contractor in writing that in his opinion any man on the work is incompetent, unfaithful or disorderly, such man shall be discharged from the work and shall not be employed on it again.

Electric lighting.

24. All parts of the work shall be well illuminated by electricity. Adequate special illumination shall be provided wherever work is in progress or is to be inspected. Electric wires must be kept thoroughly insulated, and special precaution must be taken to avoid short circuits. Wherever electric power is used the power circuit shall be kept separate from the lighting circuit.



SPECIFICATIONS—PAYMENT.

25. The Engineer will give all lines and grades and will indicate the same by marks or points established at such intervals or in such manner as he deems necessary for the proper performance of the work. Such points and marks shall be carefully preserved by the Contractor.

Lines and grades.

26. The Contractor shall keep the Engineer informed, a reasonable time in advance, of the time and places at which he intends to do work, in order that lines and grades may be furnished with the minimum of inconvenience to the Engineer and delay to the Contractor.

Request for lines and grades.

27. To facilitate the transfer of lines and grades, the Contractor shall, without charge to the Commissions, suspend hoisting and all work that will in any way interfere with the surveys at such times and for such periods of time as the Engineer may deem necessary.

Transfer of lines and grades.

28. The Contractor shall give to the Engineer all necessary assistance and facilities for establishing benches and plugs and for making measurements.

Facilities for Engineer.

29. If the Engineer shall deem it necessary or advisable to make wash-borings or core-borings or both to supplement the borings already made or to drive test piles to obtain further information as to the character, extent and bearing power of the materials to be encountered in the construction of the Tunnel, the Contractor shall make such borings or drive such piles in the manner, at the location and to the depths directed by the Engineer, and payment therefor will be made in the manner provided in Schedule Item 300.

Additional borings.

Payment for compliance with the requirements of this Subdivision, except as otherwise herein specifically provided, is deemed to be included in the unit prices stipulated in the Schedule.

Payment.

SPECIFICATIONS—MAINTENANCE OF TRAFFIC.

SUBDIVISION 2—MAINTENANCE OF TRAFFIC.

Facilities  
for traffic.

30. The Contractor shall provide all necessary facilities for street traffic, and shall conduct his work so as to keep such traffic free from interruption, and as far as practicable from interference.

Operations  
near railroads.

31. All operations over, under or in the vicinity of railroads shall be so conducted as not to endanger or interfere with the passage of locomotives, cars or trains.

Surface to be  
maintained  
with decking.

32. Wherever excavations are carried underneath the roadway referred to in Section 33 or railroad tracks the Contractor shall bridge such excavations with suitable planking or decking and maintain the same in good condition and repair until the surface is restored.

Maintaining  
and lighting  
of roadway.

33. The Contractor shall maintain in a safe and passable condition the access roadway on Twelfth Street and Twelfth Street produced, from Provost Street to the easterly limit of the North Tunnel to be constructed under this contract beginning sixty (60) days after delivery of the Contract. Such maintenance is to include the upkeep of roadway, fences and lights together with the furnishing of the necessary current for lighting purposes. After the completion of the New Jersey River Tunnel Section (Contract No. 4), the Contractor herein shall maintain this road and its equipment eastward to the land shafts until the completion of this contract.

Guarding  
roadway.

The roadway, fences and lights referred to in this Section shall be turned over to the Commissions in good condition at the termination of this contract.

Facilities  
for other  
contractors.

34. The Contractor is to afford to any other contractor, who may be or has been awarded a contract for doing work in connection with the construction of the Vehicular Tunnel, adequate and sufficient rights of passage and re-passage over the roadway. In the event of a dispute between the Contractor herein and any other contractor or contractors having the right to use the roadway, the

Engineer shall be the sole and final arbiter in the determination of the rights of the respective contractors to use the said roadway, and the extent to which each of them shall be entitled to use the said roadway and the time and manner thereof.

36. Wherever excavations are decked or where gas might accumulate, suitable openings shall be provided for ventilation.

Openings for ventilation.

37. The storage of structural and other materials in the streets occupied by or adjacent to the work shall be to the extent permitted by the Engineer, as necessary for the conduct of the work, which permission shall be revocable at any time, and the Contractor, if so directed, shall immediately remove such materials.

Storage of materials in streets.

38. The Contractor will be permitted to occupy the streets as approved by the Engineer provided that such occupation shall be regulated so as to cause the least practicable interference with travel or with the use of adjacent property.

Occupation of streets.

The Contractor shall at all times at his own expense keep all the street crossings in a clean and neat condition, bridging gutters and low places where water might collect.

Street crossings to be kept clean.

39. The Contractor shall not interfere with free access to any fire hydrant or fire alarm box, and shall place no materials within ten (10) feet of the same at any time. When materials are unavoidably placed or piled in the vicinity of a fire hydrant or fire alarm box and to such a height as to prevent it from being readily seen, the position of such hydrant or box shall be indicated by suitable signals, both day and night. When required, hydrants shall be extended by suitable tube or piping to an accessible point as approved by the Engineer and to the satisfaction of the Fire Department.

Access to fire hydrants.

40. The Contractor shall not deprive the occupants of any building or abutting property of means of access

Access to buildings.

except with the consent of the occupants and after due notice to the Commissions. Where openings are made in streets, suitable bridges shall be built and maintained, at the Contractor's expense, to permit owners and occupants to reach their premises. When access to any building or abutting property is temporarily cut off by the Contractor, he shall at his own expense handle any materials to be taken to or removed from such building or property, including materials to be removed by the Street Cleaning Department, between such building or property and the nearest accessible point on the street.

Decking.

41. Decking shall be substantially constructed of ample strength to carry the loads to which the surfaces which it temporarily replaces are subject. Plans for such decking must be approved by the Engineer before the decking is placed. In excavations covered by decking a means of illumination, satisfactory to the Engineer, must be provided and maintained at all times, whether or not work is in progress, so that the supports of the decking may at all times be readily inspected; and as a further means toward this inspection, galleries or walkways must be provided beneath the decking, so that inspection of its supports may readily be made when the excavation reaches such depth as, in the opinion of the Engineer, may render such walkways necessary.

Decking,  
how laid.

All decking and bridging and all timbers for the support thereof shall be sound, substantial and free from any defects that might impair their strength. The decking of roadways shall be of such thickness, and shall be so laid and supported, as to prevent deflection of adjacent planks separately when loaded. The planking of the top or wearing surface shall be hard yellow pine, unless otherwise permitted, shall be straight and free from shakes, shall be sized to a uniform thickness and shall be laid with tight joints.



42. Payment for compliance with the requirements of this Subdivision is deemed to be included in the unit prices stipulated in the Schedule.

Payment.

SUBDIVISION 3—SUPPORT AND RESTORATION OF STRUCTURES.

44. The Contractor shall make use of such methods of work as are best adapted to preserve the safety and stability of foundations, railroads, railroad tunnel structures, tanks, walls or other parts of buildings and structures and to prevent any disturbance or damage thereto and he shall make good any damage which may in the course of construction be done to any such foundations, railroads, railroad tunnel structures, tanks, walls or other parts of buildings or structures.

Prevention of damage.

45. The Contractor will be permitted to underpin, protect or support at his own expense such buildings, railroads, railroad tunnel structures, tanks or other structures as he may deem advantageous to himself in the prosecution of his work to so underpin, protect or support.

Underpinning.

All methods of underpinning, protecting, supporting, or maintaining buildings, railroads, railroad tunnel structures, tanks or other structures or of providing permanent foundations therefor shall be in accordance with drawings prepared by the Contractor and approved by the Engineer; but the approval by the Engineer of such drawings or methods shall not relieve the Contractor of responsibility for injury to persons and damage to property as herein elsewhere provided.

Approval not to relieve Contractor.

46. The Contractor at his own expense, shall make with the owners or tenants of buildings, railroads, railroad tunnel structures, tanks or other structures, or other persons, all arrangements which may be necessary for the underpinning, protecting, supporting and repair or restoration of buildings or other structures.

Agreements for underpinning or supporting structures.



Structures  
to be kept  
in a service-  
able condition.

47. During the progress of the work, the Contractor shall make such temporary or permanent repairs or restoration as may be required to keep all structures, or parts of structures, disturbed or damaged by his operations, in a serviceable condition at all times, taking such other measures as may be necessary for the protection of persons or property in or about the same.

Repairs  
to be made  
promptly.

48. As soon as the work adjacent to any structure, disturbed or damaged by the Contractor's operations, is unlikely, in the opinion of the Engineer, to cause any further disturbance or damage, the Contractor shall promptly repair and make good all damage to such structure for which he is responsible as herein elsewhere provided.

Annoyance  
to occupants  
to be avoided.

49. When the Contractor has entered upon any premises for the purpose of underpinning, protecting, supporting, repairing or restoring the same, he shall conduct the work with all possible dispatch and in such manner that the annoyance to the occupants shall be as little as is practicable.

Commissions  
may make  
repairs.

50. If at any time the Engineer shall certify to the Commissions that the Contractor is unnecessarily or unreasonably delaying the work of repair or restoration of any structure disturbed or damaged by his work or is neglecting to provide proper protection for persons or property in or about such structure, the Commissions may make such repairs or cause the same to be made or provide such protection or cause the same to be provided and charge the expense of such work to the Contractor and may in addition to all other remedies deduct such expense from any moneys then due or thereafter coming due to the Contractor under this contract.

Payment for  
underpinning.

51. Payment for underpinning, protecting or supporting buildings, railroads, railroad tunnel structures, tanks, or other structures, their walls and other supports, and other parts of structures underpinned, protected or sup-

ported by the Contractor and all expense in connection therewith or incidental thereto is deemed to be included in the unit prices stipulated in the Schedule for excavation.

52. Payment for repairing or restoring buildings, railroads, railroad tunnel structures, tanks, or other structures disturbed or damaged, directly or indirectly, by the Contractor's operations, and all expense in connection therewith or incidental thereto, is deemed to be included in the unit prices stipulated in the Schedule for excavation.

Payment for repairing structures.

SUBDIVISION 4—MAINTENANCE AND CHANGES OF PIPES, RAILROADS, ETC.

53. Notice shall be given by the Contractor to the Erie Railroad Company, the Delaware, Lackawanna and Western Railroad Company, the Hudson and Manhattan Railroad Company and to all individuals, companies and City officials owning or having charge of surface, sub-surface or overhead structures along any part of the work, of his intention to commence operations on such part of the work, at least one (1) week in advance of such commencement, and the Contractor shall file with the Commissions at the same time a copy of such notice.

Notice to owners, etc., of structures.

54. All work of protecting, maintaining, moving, changing or restoring surface, sub-surface or overhead structures or appurtenances, shall be conducted in accordance with the reasonable requirements, and to the reasonable satisfaction of the companies or City officials owning or having charge of the same, and the Contractor shall furnish such companies or City officials with all necessary facilities for inspecting the methods of caring for their structures as required by the Engineer.

Requirements of owners, etc., of structures.

55. The Contractor shall, at all times, by suitable means, protect from damage, maintain and support in an entirely safe condition for their usual service all sewers, pipes, ducts, conduits, poles, wires, cables, railroads, rail-

Maintenance and support of structures.

road tunnel structures, tanks, walls and all other surface, sub-surface and overhead structures or works with their connections and other appurtenances, encountered in or affected by his work.

Temporary changes for maintenance.

56. If such protection or the maintenance for such usual service makes it necessary, the Contractor shall temporarily shift, relay or reconstruct any such surface, sub-surface or overhead structure or appurtenance, and if required shall fully restore the same prior to the completion of this contract.

Temporary changes for Contractor's convenience.

57. If the Contractor shall, for his own convenience in executing his work, temporarily shift, relay or reconstruct any structure or appurtenance, he shall fully restore the same prior to the completion of this contract, but no such shifting, relaying or reconstructing shall be done without the previous consent of the Engineer.

Changes to avoid interference with the Tunnel.

58. If it is found that any such structure or any connection or other appurtenance of such structure in its original position would physically interfere with the Tunnel, the Contractor shall permanently shift, relay or reconstruct such structure or appurtenance to the extent required by the Engineer and according to his directions.

Repairs of damage.

59. If any damage should occur to any such structure or appurtenance resulting from the Contractor's operations or in any way incidental thereto, he shall promptly and fully repair or restore such structure or appurtenance to as good a condition as existed before the damage was done and shall leave the same in a condition as useful, safe, durable and good as that which existed before his work began.

Maintenance and support of miscellaneous cables, etc.

60. The Contractor shall carefully guard, protect and maintain, without damage or interruption of service, all wires, cables, or ducts encountered in or affected by his work; but should any such damage or interruption accidentally occur, he shall immediately notify the owner

and shall repair the damage and restore the service as quickly as possible.

61. The Contractor shall make all necessary arrangements for shutting off and restoring the flow in water and gas pipes and their connections, and shall bear all necessary expense in connection with the same. In case it becomes necessary to shut off or interfere with the normal and continuous flow of water in any main, or with the connection to any hydrant, the Contractor shall give notice thereof to the proper authorities at least forty-eight (48) hours in advance of such shutting off or interference. In case it becomes necessary to shut off the water supply to any building, due notice shall be given in advance to the owners or tenants thereof. Copies of all such notices, referred to in this or the preceding paragraph, shall be sent to the Commissions at the time of their issuance. The Contractor shall, if so ordered, make a temporary by-pass or other arrangement to preserve the flow of water while breaking connections.

Shutting off  
and restoring  
flow in water  
and gas pipes.

62. Before excavating below any water or gas main in service, the Contractor shall ascertain the locations of all gates or valves in such main within the line of his work or adjacent thereto. A diagram showing such locations in exact relation to street and curb lines shall be kept posted in the Contractor's office on the work, for reference in case of emergency.

Location of  
gates to be  
ascertained.

63. The Contractor shall provide convenient access to gates and valves on water and gas mains and to electric and other manholes, by means of trapdoors or other approved methods.

Access to  
gates, valves  
and manholes.

Whenever an electric manhole has been removed it shall be replaced by a temporary manhole, which shall be so constructed as to reasonably provide the usual facilities, and the cables shall be supported by temporary racks. Wherever practicable, as determined by the Engineer, the ducts shall be supported and maintained,

Electric  
manholes.



but should it become necessary to remove the ducts from the cables, the cables shall be protected by a satisfactory boxing.

Cast-iron  
pipes to be  
preserved.

64. Wherever cast-iron pipe is changed, the Contractor shall use care in removing, and shall preserve all old pipe that is in good condition, so that it may be used in relaying and to avoid as far as possible the necessity of providing new pipe.

Support of  
railroad  
structures.

65. Wherever excavations are made under or adjacent to any railroad structure, the Contractor shall employ such methods as may be necessary to preserve the safety of such railroad and maintain the tracks in a serviceable condition conforming to the reasonable requirements of the Railroad Company.

Plans of  
structures  
to be shifted.

67. The Engineer will prepare from time to time, as may be necessary, drawings showing the proposed rearrangement of surface, subsurface and overhead structures to be shifted, relaid or restored, and will submit the same to the parties interested. If any reasonable changes are requested by any of the said parties within ten (10) days after the submission of any drawing, such changes will be made, if in the judgment of the Engineer they will best conserve the interests of all parties concerned.

Restoration  
of structures.

68. As soon as the progress of the work permits, the Contractor shall restore all surface, subsurface and overhead structures or appurtenances which have been changed on account of the tunnel work or in any way affected thereby, to a condition as useful, safe, durable and good as that which existed before his work began.

Expense of  
maintenance  
and changes  
of structures.

69. Payment for protecting, supporting, maintaining, shifting, relaying, reconstructing and restoring all railroads and other surface, subsurface and overhead structures and their appurtenances, and all expense in connection therewith or incidental thereto, except as other-



SPECIFICATIONS—EXCAVATION.

wise herein specifically provided, is deemed to be included in the unit prices stipulated in the Schedule for excavation.

72. If the owners or the City should desire to make any addition, alteration or extension to their structures or to do any work to or in connection with surface, subsurface or overhead structures owned by them or to lay any new structure in or across a street occupied by the Works, the Contractor, by written permission, shall give said owners or the City all reasonable opportunity to perform such work; provided such work or alteration for the benefit solely of the owners of such structures does not cause the Contractor any serious loss or delay, as shall be determined by the Engineer.

Facilities to be given owners to make extensions.

SUBDIVISION 5—EXCAVATION.

73. Excavation is to be in open cut, with the exception of the sinking of caisson foundations near the land shafts.

Excavation, how made.

74. Excavation will include the removal of earth, rock, boulders, steel, concrete, pavement, masonry, piles, timber, pipes and all other material that it is necessary to remove in order to construct the Tunnel.

Excavation, includes removal of all material.

77. The Contractor shall provide at his own expense such magazine houses as may be necessary for the storage of explosives, subject to the approval of the Engineer.

Magazines for storage of explosives.

78. Special care shall be taken in the use of explosives under or adjacent to buildings or other surface, subsurface or overhead structures. When any foundation or subsurface structure is encountered in or alongside any excavation, the Contractor may be required to remove all material within five (5) feet of the same by means other than blasting. Wherever an electric current is used in discharging a blast the wires used shall be so insulated, placed and fastened at such a distance from any light or power line that there is no possibility of a short circuit in the blasting wires.

Blasting adjacent to buildings.

Use of  
explosives.

79. All regulations that the Engineer may require, regarding the composition, transportation, storage and use of explosives shall be strictly complied with. The composition of explosives shall be such as to cause the least amount of injurious fumes. The quantity kept on hand shall not exceed the amount that is necessary to avoid delay to the work. Only experienced men shall be allowed to handle explosives. The Contractor may be required to observe special regulations regarding the time of blasting.

Sheeting,  
bracing, etc.

80. Sheeting of an approved type shall be used in making excavation. All timber and lumber used for shoring, bracing, decking or similar purposes shall be sound and free from any defects that might impair its strength and of sufficient dimensions for the purposes intended. All timber and lumber for purposes of the work required under this contract shall be put in place by skilled workmen, shall be keyed tight by wedges where necessary and shall be so arranged as to be removed, if required, without disturbing the sides of the excavation.

Excavations  
to be kept  
dry.

81. The Contractor shall keep all parts of the excavation sufficiently free from water to enable work to be done as nearly as possible in the dry. All water removed from the Tunnel shall be conveyed to a suitable point of discharge, in covered flumes, or pipes, if required. It shall be allowed to settle in a tank or sump before being discharged into any sewer. The Contractor shall be responsible for any expense incurred in removing from sewers deposits caused by his work.

Pumping  
and the  
use of  
compressed  
air.

82. Water shall be kept from the excavation either by pumping or by the use of compressed air. If water is removed by pumping, the water shall first be drained to a central sump so arranged that the material in or around the excavation will not be disturbed by the pumping; well points or other special devices may be required, the rate of flow from each well being made

so slow as not to remove the finest particles of material. If compressed air is used, sufficient air pressure shall be maintained at all times to permit the work to be done in the dry.

84. All cars, carts, buckets and other vehicles used by the Contractor for the transportation of material shall be tight and so arranged and so loaded as not to spill. Whenever a car, cart, bucket or other vehicle so used is leaky or unsuitable, it shall be immediately withdrawn from the work on notification by the Engineer.

Carts, etc.,  
to be tight.

85. Excavated and waste material shall be removed expeditiously and disposed of in any place selected by the Contractor except as hereinafter provided.

Disposal of  
excavated  
material.

All curb, gutter, flagging and paving stones, necessary to be removed, which, in the judgment of the Engineer, are suitable to be used again, shall be stored by the Contractor, who shall be responsible for such storage until these materials are used in surface restoration.

Paving  
materials  
to be  
preserved.

86. If at any time during the course of construction the States shall desire for their purposes or for the purpose of any political subdivision which they include, any part of the material excavated and the cost of such disposal shall not exceed the cost to the Contractor of the method in which he is then disposing of it, the Commissions may order such material dumped or turned over to the States, or any political subdivision which they include, at points designated by the Commissions without additional expense to the States. Anything encountered in connection with the excavation, such as relics or any other valuable material shall be considered the property of the Commissions and shall be disposed of as directed by the Commissions.

Excavated  
material may  
be taken by  
States.

Payment for compliance with the requirements of this Subdivision is deemed to be included in the unit prices stipulated in the Schedule for excavation.

Payment.

SUBDIVISION 6—COMPRESSED AIR REQUIREMENTS.

Plant to be adequate.

88. Where excavation is made in a compressed air chamber the Contractor shall, as provided in Section 11, furnish an adequate plant, including air compressors, electrical machinery, hoists and all other necessary apparatus, all parts of which shall be of the highest grade in use for the work to be performed. The capacity of the plant shall be sufficient to meet not only usual conditions but emergencies and afford at all times a sufficient margin for repairs.

Capacity of air-compressing plant.

90. The air-compressing plant shall be capable of furnishing to excavation chambers an air supply sufficient in volume and pressure to enable work to be done as nearly as practicable in the dry and to afford a proper degree of ventilation. The air for the compressors shall be drawn from pure outside sources and care must be taken to keep the air from being fouled from smoke, lubricating oil or other impurities.

Air to be cooled.

92. Suitable and sufficient cooling apparatus shall be used to keep the temperature of the air supplied to the air chambers moderate at all times.

Workmen's quarters.

94. The quarters for the workmen and other provisions in regard to the employment of men in compressed air shall be as provided under the Laws of the State of New Jersey.

Air gauges.

102. An approved recording gauge connecting with each compressed air chamber shall be installed and maintained by the Contractor in proper working condition, without additional cost to the Commissions. The gauge shall be placed in a locked box and the key delivered to the Engineer, who shall have charge of the gauge. All gauge records shall belong to the Commissions.

Air supply pipes.

104. The air supplied to the compressed air chambers shall be delivered through pipes of such capacity that the drop in pressure under regular working conditions shall



not be excessive. There shall be at least two (2) such air supply pipes provided to each air chamber with suitable clapper valves at the discharge ends.

106. Payment for the use of compressed air, the conduct of all work therein and compliance with all the requirements of this Subdivision is deemed to be included in the unit price stipulated in the Schedule for excavation, which price covers all expenses in connection therewith or incidental thereto.

Payment for compressed air use and requirements.

SUBDIVISION 7—MATERIALS AND WORKMANSHIP.

107. All materials and workmanship shall be of the best class in every respect, and the Engineer shall be the sole judge of their quality and adequacy.

Best materials and workmanship.

108. Any imperfect construction which may be discovered before the final completion and acceptance of the Works shall be corrected immediately upon the requirement of the Engineer and at the Contractor's expense, notwithstanding that it may have been accepted previously or estimated for payment.

Imperfect construction to be corrected.

109. Any work of whatever kind which may become damaged from any cause before the final completion and acceptance of the Works shall be broken up or removed and be replaced by good and sound work at the Contractor's expense.

Damaged work to be replaced.

110. If any material brought on the ground for use in the work or selected for the same shall be condemned by the Engineer as unsuitable or not in conformity with the specifications, the Contractor shall forthwith remove such material.

Condemned materials to be removed.

It is the intent and purpose of these specifications to secure an underground structure which shall be free from the percolation of water, and to this end methods are herein provided for mixing and placing concrete and

Structures to be water-tight.

placing and protecting waterproofing to insure a water-tight structure.

Payment. 111. Payment for compliance with the requirements of this Subdivision is deemed to be included in the unit prices stipulated in the Schedule.

SUBDIVISION 8—BACKFILLING AND CLEANING UP.

When and where placed. 112. As soon as the progress of the work permits, backfilling shall be placed and surface restoration completed, which includes the placing of fill required for raising the grades in the Erie Railroad Yard, as shown on the drawings.

Placing and compacting. 113. Material used in backfilling, except as otherwise provided, shall be sand or sand and gravel or other good, clean earth, free from perishable material and from stones exceeding six (6) inches in diameter, and not containing in any place a proportion of stone exceeding one (1) part of stone to five (5) parts of earth. Backfilling shall be deposited in layers not exceeding nine (9) inches in thickness and each layer shall be well moistened and then thoroughly compacted by ramming. Also from time to time during the course of backfilling and finally upon the completion of backfilling at any place, such backfilling shall be further compacted by flooding with water as required by the Engineer. Where the spaces to be backfilled are too narrow to admit of ramming, the backfilling of such spaces shall be thoroughly compacted by flooding with water. No filling of trenches with frozen earth will be permitted nor will any filling be permitted over frozen material.

Filling around pipes. 114. Wherever pipes, sewers or other subsurface structures are met, the filling must be carefully packed, rammed and tamped under and about such subsurface structures, special tools being used for the purpose.

115. As fast as the work permits, the timber supporting the sides of the excavations shall be removed and the excavations shall be carefully backfilled.

Timber to be removed.

116. At the completion of the work or any part thereof, the Contractor's plant, together with all of its foundations or subsurface connections, shall be removed and the surface of the ground or street restored to its original condition.

Removal of plant.

When required by the Engineer, any portion of the completed Tunnel or any part of the surface not used by the Contractor shall be cleared for use of other contractors engaged in the construction of the Vehicular Tunnel. Before final payment is made all parts of the Works shall be cleaned up and put in a condition acceptable to the Engineer.

Cleaning up.

117. Payment for backfilling and cleaning up is deemed to be included in the unit prices stipulated in the Schedule for excavation.

Payment for backfilling and cleaning up.

## ITEMS.

### ITEMS 1-5—EXCAVATION.

Width to  
be limited.

1-1. Special care shall be taken to avoid damage wherever excavation is being done. All excavations shall be of such widths as may be necessary, in the opinion of the Engineer, for the proper and expeditious progress of the work and for protecting, maintaining and changing sewers, pipes, ducts, conduits and other subsurface structures.

Depth to  
be limited.

1-2. Excavations shall be made to such depths as may be necessary to permit the laying of such concrete bed, special foundation or such drain pipes, as the Engineer may deem necessary, but if the bottom of any excavation be taken out beyond the limits prescribed, it shall be refilled at the Contractor's expense with concrete or other suitable filling, as the Engineer may direct.

Excavations  
to be secured.

1-3. The sides of excavations shall be secured against movement by suitable sheet piling, or sheeting held in place by suitable waling or bracing timbers, or suitable retaining walls, special precautions being taken where there is additional pressure due to the presence of railroad tracks, railroad tunnel structures, tanks, buildings or other structures. Where a movement of the ground might cause the settlement of an adjacent structure, the sheeting must be started, if near the structure, before the level of the bottom of the foundation of the structure is reached, and if away from the structure, at such depth of the excavation as the Engineer may approve, and the excavation must not be made in advance of or below the bottom of the sheeting.

Driving sheet  
piling.

The driving of sheet piling in the vicinity of the Hudson and Manhattan Railroad tunnel structures shall be conducted in such a manner as to insure them against damage.

Voids back  
of sheeting  
to be filled.

1-4. Sheetting shall be driven wherever possible, but in whatever way it may be placed against the sides of



the excavation, the spaces or voids back of the sheeting must be immediately and carefully filled with suitable material to prevent, as far as possible, any movement of the ground back of the sheeting.

No payment will be made for sheeting left in the ground or in the work unless the Engineer shall in writing require it to be so left, in which case payment will be made for such sheeting, as measured by the Engineer, at one-half the market price for new sheeting of the same grade, character and dimensions, and without any allowance or payment for placing the same.

Payment,  
sheeting  
left in work.

1-7. Measurement for payment for any excavation will be governed by the net or neat lines, as ordered and indicated on the drawings, of the sides and bottom of the structure for which the excavation is made, within which lines no unexcavated material nor other material not indicated on such drawings will be permitted to remain. The volume to be estimated for payment for any excavation, except for the additions hereinafter provided for in this Section and in Sections 1-8, 1-9, 1-10, 1-11 and 1-12, will be limited to the volume formed by the projection of such net or neat lines vertically upward to the surface, it being understood that there is thus defined the volume of the material in place before its removal included vertically above the bottom surface bounded by such net or neat lines. The lines fixing the volume so formed shall be deemed to be the ordered net lines of excavation for any excavation made from the surface.

Measurement  
of excavation.

In estimating volumes no addition will be made for slips or slides or for swelling or increase in volume after removal, nor will any volume be measured more than once within the same space; but no deduction will be made for spaces occupied by sewers, pipes or other sub-surface structures.

Volume to be  
estimated.

At the easterly limit of the tunnel section of this contract, excavation will be measured as provided above,

Temporary  
bulkheads to  
be removed.

except that the volume of the tunnel structure built under Contract No. 4 will be deducted. The temporary bulkheads in the tunnels and in the air ducts shall be removed at such time and in such manner as is approved by the Engineer. Separate payment will not be made for this, but compensation therefor is deemed to be included in the unit prices stipulated in the Schedule for excavation.

Minimum width of excavation.

No excavation not forming part of a wider excavation, will be estimated for payment at less than three (3) feet in width.

Measurement for brick or concrete sewer excavation.

1-8. In excavation for new brick or concrete sewers the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation, the volume extending six (6) inches horizontally outside such lines from the sides of the structure above the bottom surface.

Measurement for steel pipe or vitrified pipe sewers.

In excavation for new cast-iron, steel or vitrified pipe sewers the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation, the volume extending outside such lines to vertical lines six (6) inches horizontally distant from the outside horizontal diameter of the sewer [or eighteen (18) inches if the interior diameter of such pipe is thirty (30) inches or more] and above horizontal lines six (6) inches below the bottom of the outside barrel of the sewer.

Measurement at junction with old sewers.

At the junctions with the old sewer at either end, the volume of payment excavation shall be limited by a plane at right angles to the center line of the old sewer at the point on the center line where the change due to reconstruction or relocation begins.

Old sewers to be removed.

The two steel pipe sewers now located in Provost and Thirteenth Streets are to be removed between their new connections in Provost Street and their point of junction with the reconstructed sewers east of the tunnel structure. A vitrified pipe sewer is to be laid in the trench formerly occupied by one of the steel pipe sewers, payment for which, including excavation, will be made under Schedule Item 130.

Payment for excavation will be measured along the line of each new or relocated sewer in its new location. Separate payment will not be made for the removal of any abandoned sewers (including those described in the preceding paragraph and the steel pipe sewer in Twelfth Street), but payment therefor is deemed to be included in the unit prices stipulated in the schedule for excavation. The steel pipe of the existing sewers shall be used in the construction of the sewers in their new locations as required by the Engineer.

Measurement  
removing  
sewers.

1-9. Excavation for caissons will be measured for payment as provided in Section 1-7, except that the net or neat lines, instead of being projected vertically, will be projected parallel to the vertical or nearly vertical axis of the caisson. Payment excavation is to be limited to the position of the caisson requirements under Section 55-1. The upper limit for the measurement of caisson excavation will be the subgrade of the overlying structure, or where there is no overlying structure, mean high water.

Measurement  
of caisson ex-  
cavation.

1-10. In excavations for sewer manholes and receiving basins, the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation, the volume extending outside such lines for the sides of the structure to the lines of the smallest rectangular prism, having vertical sides, that will enclose the ordered net lines of excavation for the sides of the structure and lying six (6) inches horizontally distant therefrom.

Measurement  
of excavation  
for sewer  
manholes  
and receiving  
basins.

1-11. In all excavations for changing any such water, gas or other pipe, except sewer pipes and electric conduits, as are enumerated in the Schedule and in excess of excavations otherwise required, the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation for such pipe, the volume extending outside such lines to vertical lines twelve (12) inches [or eighteen (18) inches if the interior diameter of such pipe is thirty (30) inches or more]

Measurement  
of excavation  
for pipes.

SPECIFICATIONS—EXCAVATION.

horizontally distant from the extremities of the horizontal interior diameter of such pipe and above horizontal lines six (6) inches below the outside of barrel of such pipe. The ends of payment excavation shall be limited by vertical planes twelve (12) inches beyond the ends of the newly set pipe.

Measurement  
of excavation  
for hydrants,  
etc.

In excavations for hydrants, valves, valve boxes and valve chambers appurtenant to such pipes, the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation, the volume extending twelve (12) inches horizontally outside such lines for the sides of such appurtenance above horizontal lines six (6) inches below its lowest point.

Measurement  
of excavation  
for ducts and  
conduits.

1-12. In all excavations for changing such ducts or conduits as are enumerated in the Schedule and which have been moved to avoid physical interference with the Tunnel and in excess of excavation otherwise required, the volume to be estimated for payment will include, in addition to the volume within the ordered net lines of excavation for such ducts and conduits and their appurtenant manholes and vaults, the volume extending six (6) inches horizontally outside such lines for the sides of the structure above the bottom of the structure.

Payment for  
excavation.

1-13. Payment for excavation will be at the price stipulated in Schedule Item:

2. For excavation above mean high water;
3. For excavation below mean high water, except caisson excavation; or
5. For caisson excavation;

for the volume of excavation measured as hereinbefore provided.



SPECIFICATIONS—MAINTAINING RAILROAD STRUCTURES.

Such payment shall be in full compensation for all excavation, whether made in normal air or in compressed air and whether within or without the payment lines, and all expense in connection therewith or incidental thereto, it being understood that allowance is included in such stipulated price for all excavation in excess of that limited by the payment lines, for all sheeting, bracing, timbering, steel bearing plates and steel wedges used in timbering, fencing, decking and bridging for maintaining and supporting trenches during and after excavation, for the removal and disposal of all excavated and other materials, for all temporary drains, pumping, bailing and use of compressed air, for lighting, for back-filling, for tearing down, removing and disposing of buildings, and all work in connection therewith or incidental thereto, and for all such protection, underpinning, maintenance, support, reconstruction and restoration of buildings, parts of buildings, railroad tracks, railroad tunnel structures, tanks, or other surface, sub-surface and overhead structures of whatever nature, and their appurtenances, as are not specifically provided to be paid for at or in other classified unit prices of the Schedule.

ITEM 20—MAINTAINING RAILROAD STRUCTURES.

20-1. Tunnel construction in the Erie Railroad Yard shall begin at the easterly end, and in prosecuting his work, the Contractor shall comply with all the reasonable requirements of the Erie Railroad for facilitating train operation and insuring the safety of both railroad equipment and railroad employees. The work shall be separated from the rest of the Yard by a suitable fence as required in Section 22.

Tunnel construction in Erie Railroad Yard.

The Contractor will be required to support certain of the railroad tracks over the work as shown on the drawings by means of a substructure approved by the Chief Engineer of the Commissions and the Chief Engineer of

Support of tracks.



the Erie Railroad. The Contractor will not be required to do any work of track laying or maintenance other than providing and maintaining an adequate supporting structure as herein required.

Change of  
grade.

The Contractor shall raise the grade of the Erie Railroad Yard over and adjacent to the line of the tunnel as shown on the drawings by depositing material, which shall be leveled off as required by the Engineer. The raising of the railroad tracks in connection with this work will be done by the Erie Railroad without expense to the Contractor.

Restoration,  
Erie Railroad  
Tracks.

The restoration of all railroad tracks in the Yard and in Twelfth Street, after the subgrade has been prepared by the Contractor, will be done by the Erie Railroad without expense to the Contractor.

Tunnel construction,  
Lackawanna  
Railroad  
Yard.

20-2. During construction in the Delaware, Lackawanna and Western Railroad Yard, the Contractor shall comply with all the reasonable requirements of the Delaware, Lackawanna and Western Railroad for facilitating train operation and insuring the safety of both railroad equipment and railroad employees. The work shall be separated from the rest of the Yard by a suitable fence as required in Section 22.

Support of  
tracks.

The Contractor will be required to support the railroad track into Thirteenth Street where it passes over his work as shown on the drawings by means of a substructure approved by the Chief Engineer of the Commissions and the Chief Engineer of the Delaware, Lackawanna and Western Railroad. The Contractor will not be required to do any work of track laying or maintenance other than providing and maintaining an adequate supporting structure as herein required.

Service to  
Philippine  
Vegetable  
Oil Company.

During the period that the siding now serving the Philippine Vegetable Oil Company cannot be used, the Contractor shall furnish a suitable temporary discharge line

to the tanks of the Philippine Vegetable Oil Company, so that cars can be loaded on such siding as may be provided for this Company's use. If necessary, this pipe line shall be heated. Payment for providing and equipping this discharge line will be made under Schedule Item 300.

The track scales now serving the Philippine Vegetable Oil Company will be removed and discontinued without expense to the Contractor, and the Commissions will pay such additional weighing charges as may be necessitated by cars being transferred to other scales during the period the scales now serving this Company are discontinued. The Contractor shall prosecute his work at this point, so that the period that the above-mentioned scales are discontinued will be reduced to a minimum.

Track Scales.

20-3. The Contractor shall conduct his work in such a manner as will insure the safety of the structures of the Hudson and Manhattan Railroad. He shall protect, support and maintain the said Railroad at its intersection with the Vehicular Tunnel with its equipment and rolling stock, in a safe condition for the continuous operation of trains, according to the schedule of operation and reasonable requirements of the Hudson and Manhattan Railroad. The Contractor shall prosecute his work so as to prevent deformation of or undue loading upon the structures of the Hudson and Manhattan Railroad, consequent upon the removing, lessening or otherwise modifying existing ground pressures, and he shall so distribute and support the weight of the structures constructed by him at or near the Hudson and Manhattan Railroad as to afford protection from added pressure and unbalanced or undue concentration of loading.

Maintenance  
of Hudson and  
Manhattan  
Railroad.

The Contractor shall save harmless the Commissions and as between the Commissions and the Contractor, the Contractor shall be solely responsible for any damage to the structures of the Hudson and Manhattan Company and for any injuries to passengers or other persons or to

Contractor  
liable for  
damage.

SPECIFICATIONS—CEMENT.

property therein which may occur on account of his work. In addition to the liability incurred under Article LII, the Contractor shall indemnify and save harmless both the Commissions and the Hudson and Manhattan Railroad Company from liability upon any and all claims for damages on account of such damage or any such injuries to persons or property.

Payment

20-4. Separate payment will not be made for work to be done or materials to be furnished under Item 20, except as otherwise herein specifically provided, but payment therefor is deemed to be included in the prices stipulated in the Schedule for excavation.

ITEM 25—CEMENT.

Portland  
cement.

25-1. All cement used in the work shall be true Portland cement, by which is meant the finely pulverized product resulting from the calcinating to incipient fusion of a properly proportioned intimate mixture of argillaceous and calcareous earths or rocks with no addition subsequent to calcination excepting water and calcined or uncalcined gypsum.

Brand to be  
approved.

25-2. Before any cement is furnished, the brand shall receive the approval of the Engineer. Cement, to be acceptable, shall be of a well-known brand which has been in successful use for large engineering works in the United States for at least five (5) years and which has an established reputation for uniform character. Preference will be given to cements which, by their records, show a tendency to maintain high strength of mortar with increased age.

Inspection.

25-3. Cement shall be subject to inspection at the place of manufacture and on the work and to such tests as may be ordered by the Engineer. The Engineer and his representatives shall have access at all times and places to inspect the methods of manufacture, storage

and protection and shall have liberty to inspect the daily laboratory records of tests and analyses at the cement works.

25-4. Unless otherwise directed, samples will be taken at the place of manufacture by a representative of the Engineer and sent to the Commissions' laboratory where the tests will be made. If required, tests will be made on the individual samples without intermixing. Methods of testing by the Engineer will, in general, conform to the methods recommended by the Committee on Uniform Tests of Cement of the American Society of Civil Engineers, but the Engineer shall have the right to apply any other tests which he may desire in determining the acceptability of the cements. Cement kept in storage several months may be subjected to repeated tests if required by the Engineer.

Tests.

25-5. Portland cement shall have a specific gravity of not less than 3.10 nor more than 3.25 after being thoroughly dried at a temperature of 212 degrees F. The color shall be uniform, bluish gray, free from yellow or brown particles.

Specific gravity and color.

25-6. Chemical analyses of cement made from time to time shall show a reasonably uniform composition. Portland cement shall contain not more than 2 per centum of sulphuric anhydride ( $\text{SO}_3$ ) nor more than 4 per centum of magnesia ( $\text{MgO}$ ).

Chemical analyses.

25-7. Portland cement shall be of such fineness that it shall leave a residue, by weight, of not more than twenty-two per centum (22%) on a standard No. 200 sieve.

Fineness.

25-8. Portland cement shall not develop initial set in less than forty-five (45) minutes as determined by the Vicat needle test, unless a more quickly setting cement is specifically required, and shall develop final set in not less than one (1) hour nor more than ten (10) hours.

Time of setting.



Soundness.

25-9. Tests for soundness, unless otherwise required by the Engineer, will be made in the following manner: Three (3) pats of neat cement of normal consistency about three (3) inches in diameter, one-half inch thick at the center and tapering to thin edges, shall be made on clean glass plates and kept in moist air for a period of twenty-four (24) hours. The pats are then to be treated and observed as follows:

(a) A pat is to be kept in air at normal temperature, and observed at intervals for at least twenty-eight (28) days.

(b) A pat is to be kept in water maintained as near 70° F., as practicable, and observed at intervals for at least twenty-eight (28) days.

(c) A pat is to be exposed to the vapor of steam at a temperature above that of boiling water in a loosely closed vessel for at least five (5) hours.

The pats, to pass the requirements satisfactorily, shall remain firm and hard and show no signs of distortion, blotching, checking, cracking or disintegration.

Tensile strength, neat Portland cement.

25-10. Neat Portland cement briquettes shall have at the end of one (1) day in moist air a breaking strength, per square inch of sectional area, of not less than one hundred fifty (150) lbs., at the end of seven (7) days—one (1) day in moist air, six (6) days in water—of not less than five hundred (500) lbs., and at the end of twenty-eight (28) days—one (1) day in moist air, twenty-seven (27) days in water—of not less than six hundred (600) lbs., but in any case shall not show deterioration in strength over the seven (7) day test.

Tensile strength, mortar.

Mortar briquettes, composed of one (1) part of Portland cement and three (3) parts of standard Ottawa sand, by weight, shall have at the end of seven (7) days—one (1) day in moist air, six (6) days in water—a breaking

strength, per square inch of sectional area, of not less than two hundred (200) lbs.; and at the end of twenty-eight (28) days—one (1) day in moist air, twenty-seven (27) days in water—of not less than three hundred (300) lbs. The strength at twenty-eight (28) days shall show an increase of not less than fifty (50) lbs. over the strength at seven (7) days.

25-11. Tests will be made from time to time extending over longer periods than twenty-eight (28) days. If such tests show a tendency to unsoundness or unusual reduction in strength with increased age, the Engineer shall have the right to prohibit the further use of the brand of cement showing such tendency and to require that another brand be substituted therefor.

Long-time  
tests.

25-12. All Portland cement, shall be held in storage to allow ample time for tests to be made before cement is required for use.

Storage  
during tests.

25-13. Cement shall be packed and delivered in canvas sacks or other strong, well-made packages, plainly marked with the manufacturer's brand and sealed in an approved manner. The weights of such packages shall be uniform. Packages received in broken or damaged condition, or packages which are under weight, may be rejected, or accepted only as fractional packages.

Packing.

25-14. The Contractor shall at all times keep in store on the work or at some point convenient thereto an abundant supply of cement, so as to guard against possible shortage. It shall be stored in a weather-tight building with a tight floor a proper distance above the ground and with sufficient floor space to admit of storing each lot of cement of not more than two hundred (200) barrels, or its equivalent, separately, so as to facilitate identification of each individual lot in case of necessity for further tests or rejection. Bags shall be piled uniformly in tiers, with a uniform number of tiers in a

Storage  
on work.

row, so that they can be readily counted. Cement that has become partially set or otherwise damaged shall not be used.

Barrel of cement.

25-15. For all purposes for which Portland cement may be used, three hundred seventy-six (376) pounds net will be considered a barrel.

ITEMS 27-29—CONCRETE MASONRY.

Composition.

27-1. Concrete shall consist of a mixture of cement, fine aggregate, coarse aggregate, and clean, fresh water.

Fine aggregate.

27-2. Fine aggregate for concrete shall consist of sand having clean, hard, strong, durable, uncoated grains, free from soft or flaky particles, loam, alkali, organic matter or other deleterious substances. It shall be graded from fine to coarse, to the satisfaction of the Engineer, and shall contain no grains which will not pass a one-quarter ( $\frac{1}{4}$ ) inch screen, nor more than six per centum (6%) by weight which will pass a one-hundred (100) mesh screen.

The fine aggregate shall be of such quality that mortar composed of one (1) part of Portland cement and three (3) parts of fine aggregate by weight will have tensile and compressive strengths at least equal to mortar of the same consistency made from one (1) part of the same cement and three (3) parts of standard Ottawa sand.

Coarse aggregate.

27-3. Coarse aggregate for concrete shall consist of sound, hard, strong, clean gravel or sound, hard, strong broken trap rock.

Size of coarse aggregate.

27-4. Coarse aggregate for concrete shall be graded from fine to coarse to the satisfaction of the Engineer, and that which is all of one size, or practically so, shall not be used. It shall be screened or washed sufficiently to remove all dust, loam, clay or other deleterious matter and unless otherwise required, it shall contain no pieces that will pass through a hole three-eighths ( $\frac{3}{8}$ ) inch in

diameter and no pieces that will not pass through a hole one and three-fourths ( $1\frac{3}{4}$ ) inches in diameter. Coarse aggregate graded as above, but between three-eighths ( $\frac{3}{8}$ ) and one (1) inch in diameter, will be required for concrete in certain parts of the work.

The fine aggregate and the coarse aggregate, shall be separately stored and separately measured in the charging boxes for the mixer.

Storage of aggregate.

27-5. Concrete shall in general be proportioned of one (1) part of cement, two (2) parts of fine aggregate, and four (4) parts of coarse aggregate, but the Engineer may, if in his judgment conditions so require, decrease the volume of coarse aggregate.

Proportions.

Whenever the Engineer requires that the mixture of concrete be changed from one (1) part of cement, two (2) parts of fine aggregate and four (4) parts of coarse aggregate to a mixture containing a less proportion of stone, payment volume for the concrete so placed will be increased in proportion to the decrease of volume resulting from the differently proportioned mixture of concrete as determined by field tests. The above does not apply to mortar batches where all coarse aggregate is omitted, referred to in Section 27-21.

Payment, concrete of different proportions.

For purposes of mixture, three hundred seventy-six (376) pounds of Portland cement shall be estimated at three and five-tenths (3.5) cubic feet of volume. The proportional parts of fine aggregate and coarse aggregate shall be by volume, as cast into the measuring box.

Weight and volume of a barrel of cement.

The proportion of water shall be at all times as approved by the Engineer, and generally such as to make the concrete of plastic consistency so that it can be properly placed, yet dry enough to prevent separation of material and to keep water or grout from pooling on the surface when spaded in the forms.

Consistency.



Mixing by machine.

27-6. Concrete shall be machine-mixed whenever practicable. A rotary machine of a pattern approved by the Engineer and mixing only one batch at a time shall be used.

Time of mixing.

The mixing shall be thorough and uniform. The time of mixing each batch after all ingredients are in the mixer shall be determined by the Engineer for each type of machine, but the minimum time for any type of machine shall be one (1) minute.

Mixing by hand.

27-7. When the Engineer considers it impracticable to mix concrete by machine, it may be mixed by hand, according to methods approved by him.

Mixing arrangements to be approved.

27-8. The mixing plants and their locations shall be as approved by the Engineer. Concrete shall be mixed as close as practicable to the point of deposit, but mixing will generally not be permitted on the street surface.

Measuring.

Measuring boxes shall be of approved form and dimensions with the top area as small as practicable. A struck measurement will be required. Suitable means shall be provided for definitely measuring and accurately controlling the volume of water for each batch. Measuring apparatus for both aggregate and water shall be as nearly automatic as practicable. Wheelbarrow or other approximate measurements will in no case be permitted.

Receptacles to be tight.

27-9. Cars, buckets and other receptacles used for transporting concrete shall be tight and shall be of an approved pattern. The method of transporting concrete from the mixer to the forms shall be approved by the Engineer.

No retempering.

27-10. Any concrete that takes its initial set before being placed in the work shall be at once rejected and removed. No retempering will be allowed.

Water not to interfere with placing.

27-12. Care must be taken that no water shall interfere with the proper placing of concrete. Water shall be prevented from entering any excavation at a point

where concrete is being placed or while it is setting; or whenever this is not practicable, the water shall be conducted away from the concrete by means of sheet metal shields or pans connected with drains or weepers, all of which shall be grouted, if required by the Engineer. After the concrete is set and where necessary, the Contractor shall provide free drainage by pipe drains, hollow tile or broken stone, as approved by the Engineer. No concrete shall be deposited under water without the permission of the Engineer, and then only in strict accordance with his directions.

27-13. Concrete shall be placed in the forms as soon as possible after mixing, in such quantities and in such sequence of operations as will insure the plastic condition of the upper portion of the mass throughout the entire concreting of the form. As directed by the Engineer, the concrete shall be thoroughly compacted throughout the mass by spading or hammering the forms, special spading bars or tools being used as approved by the Engineer.

Depositing  
concrete.

27-14. Where reinforcing steel or wire mesh is used, satisfactory wiring or other means of support shall be provided to maintain it in the exact position it is to occupy in the completed work and to prevent it from becoming dislodged or moved in any manner when concrete is being placed.

Reinforce-  
ment to be  
kept in place.

Galvanized steel inserts as shown on the drawings shall be placed in the side walls of the approaches and in other places, for the purpose of bonding the granite facing to the concrete. The granite work mentioned herein is not a part of this Contract.

Galvanized  
steel inserts.

27-15. Suitable, clean, tight forms, substantially braced, shall be provided by the Contractor to support the concrete until it is set. If wood forms are used, the lagging shall be thoroughly fastened, kept carefully planed to a true surface and shall have tight joints. If required by the Engineer, the joints shall be either

Forms.

tongued and grooved or lapped. If metal forms are used, they shall be sufficiently strong to retain their shape without the use of wood backing. The use of wood forms covered with sheet metal will not be permitted. Whenever any form begins to lose its proper shape it shall be removed immediately from the work and replaced with a new one.

Pre-cast  
concrete  
forms.

Pre-cast concrete forms will be required, as shown on the drawings. These forms are to be true and smooth on the side adjacent to the air flue and are to be cast sufficiently ahead of time to acquire adequate strength before using.

Setting and  
supporting  
forms.

27-16. Forms shall be set in the required position and so maintained by means of centering or other supports sufficiently firm to prevent any deflection. All joints and bulkheads shall be tight against leakage of mortar or water from the concrete. The surfaces of forms used repeatedly shall be cleaned of all cement and dirt before concrete is placed. Satisfactory measures shall be taken to prevent the adhesion of mortar to the forms.

No projections  
inside air flues.

Concreting shall be so conducted that the pre-cast concrete forms, referred to in the preceding section, can be properly set so that there will be no projections at the joints on the inside of the air flue. All joints shall be securely caulked to insure against leakage of mortar or grout from the concrete.

Exposed  
surfaces to  
be smooth.

27-17. Every precaution shall be taken to place or assemble the forms in such manner that when the forms are removed, after the concrete has been placed, the surfaces of the concrete that are to remain exposed shall be smooth and even, and free from all offsets.

Surfaces  
smooth for  
waterproofing.

27-18. Concrete surfaces to which waterproofing is to be applied shall be made smooth at the time of placing and shall be carefully protected from injury until thoroughly set.

27-19. Wherever a section of concrete is left unfinished, leaving a surface which will be hard set before additional concrete can be joined to it, such dovetails, grooves or other bonds shall be provided as may be necessary to insure a good bond with the new work; and if deemed necessary by the Engineer, the joints shall be reinforced with steel bars or dowels to be furnished by the Contractor without additional payment.

Joints with  
new work.

27-20. In joints between old and new work the old surfaces shall be thoroughly cleaned by air blast or water under nozzle pressure, or both, or chiseled to remove laitance, as required by the Engineer, and such surfaces shall be wet and a neat cement wash applied, if required, immediately before placing the concrete. The payment for such work is deemed to be included in the price stipulated in the Schedule Item for concrete.

Joints  
cleaned.

27-21. In starting the work of concreting or during the progress of the work, when in the judgment of the Engineer there is need of mortar batches (without coarse aggregate) in order to avoid pockets in the finished work, such batches proportioned with cement and fine aggregate, as directed, shall be furnished by the Contractor, payment for which will be made per barrel of cement used. The volume of mortar so placed will be deducted from the payment volume of concrete. In estimating the volume of mortar so deducted the following equivalents will be used: 1 to 1 mortar will be computed as displacing 0.20 cubic yard of concrete per barrel of cement used; 1 to 2 mortar will be computed as displacing 0.30 cubic yard of concrete per barrel of cement used. This does not apply to mortar coatings placed on the surface of concrete to obtain a smooth finished surface, the use of mortar for pre-cast concrete forms, the use of neat cement wash upon old concrete before placing new concrete or any other use of mortar other than that specifically stated in this Section.

Mortar  
batches.



Removal of  
forms.

27-22. The forms shall be removed as soon after the concrete has been placed as in the judgment of the Engineer may be done with safety to the work. Directions as to the time of the removal of forms shall be strictly followed and this work shall be done with care so as to avoid injury to the concrete. Immediately upon the removal of the forms the surfaces of the concrete shall be carefully examined and any irregularities of the surface shall be corrected as directed by the Engineer. Portions of the concrete containing voids shall be cut out to the fullness of such defects and the space refilled with concrete or mortar in such proportions and in such manner as the Engineer may direct, at the Contractor's expense. Plastering will not be permitted.

Smooth  
concrete  
finish.

27-23. Any finished surface of concrete that will remain exposed in the tunnel roadway or air ducts shall be left equal to the smoothest sidewalk finish and shall be screeded, rubbed or floated, if necessary, until such a surface is obtained. The surface of the ceiling over the tunnel roadway shall be a finished surface of smooth and even character obtained as required by the Engineer by rubbing and re-rubbing, so as to obtain a surface suitable for painting.

All forms must be so placed as to avoid offsets at the junctions of sections poured at different times. If steel forms are used, the plates shall be so set as to produce a smooth even surface free from ridges or fins. All corners in exposed situations, sidewalks, inverts, and other surfaces likely to become injured shall be kept suitably covered and protected.

Rough  
concrete  
finish.

Wherever special finish is to be applied pursuant to this contract or other contracts, as shown on the drawings, the concrete shall be given a rough surface obtained by roughening or scoring the concrete in an approved manner to provide a proper bond for such finish.



27-24. During freezing weather, the Contractor shall take all necessary precautions to prevent injury to concrete by frost. The Contractor shall heat with suitable apparatus the fine aggregate, coarse aggregate and water before placing them in the mixer and all materials shall enter the mixer free from frost and ice. Concrete shall not be placed on or next to frozen surfaces. If metal forms are used, satisfactory means shall be employed to keep concrete placed against them from freezing. During freezing weather concrete shall be protected, as soon as placed, by a suitable covering of hay, canvas or tarpaulin, or in such other manner as may be required to insure it against freezing; and concrete shall not be placed in exposed places where the Engineer considers it impracticable to give such protection.

Precautions  
in freezing  
weather.

27-25. During hot weather, concrete shall be kept moist by sprinkling and properly covered until it becomes thoroughly set and hardened.

Precautions  
in hot  
weather.

27-26. It is intended that the concrete shall be water-tight; and the Contractor will be required to exercise every care in mixing, placing, spading and all other operations connected with this work, so as to provide a permanent water-tight structure. If leaks appear on the surface of the concrete at any time after it is set the Contractor shall, as directed by the Engineer, either remove the concrete through which the leakage takes place, stop the leak, repair the water proofing and refill the hole with sound concrete or take such other steps as the Engineer may consider practicable to secure water-tightness.

Concrete to be  
water-tight.

The concrete used in sealing the bottom of the working chamber of the caissons shall be placed under compressed air.

Concrete  
in com-  
pressed air.

27-27. Concrete will be measured in place in the work to the net lines of the sections ordered and indicated on the drawings; and no additional allowance by way of

Measurement  
and payment,  
concrete.

measurement will be made, nor other method of measuring used, except where the payment volume of concrete is increased due to a richer mixture as provided in Section 27-5 and except where the payment volume of concrete is decreased due to mortar batches being used as provided in Section 27-21 and due to pre-cast concrete forms being used as provided in Section 27-15. No deduction will be made for space occupied by unexcavated materials or timbering left within the payment lines and outside the net lines of the sections ordered and indicated on the drawings; and no concrete outside of such net lines will be included in the measurement for payment. In measuring the volume of concrete, the space occupied by all embedded material such as ducts, pipes, steel and iron, will be deducted from the concrete, but the space occupied by reinforcing rods and bars, wire mesh and pipes less than two (2) inches in outside diameter will not be deducted.

Measurement of pre-cast concrete forms will be of the projected area of the form shown on the drawings.

Payment for concrete will be at the price stipulated in Schedule Item:

- 27 (d). For concrete; or
- (g). For pre-cast concrete forms;

for the volume of concrete measured as hereinbefore provided; and such payment shall be in full compensation for all concrete, whether placed in normal air or in compressed air and whether within or without the payment lines, and all expense in connection therewith or incidental thereto, it being understood that allowance is included in such stipulated price for all concrete in excess of that limited by the payment lines, for all ingredients, forms, scaffolding, centering, shields or pans with drains or weepers, troweling, screeding, rubbing, floating, securing water-tightness, by grouting or otherwise, and all other things required in and for mixing, placing and finishing the concrete.

Payment for mortar batches will be at the price stipulated in Schedule Item 29, which price shall be in full compensation for furnishing, mixing and placing such batches, and all expense in connection therewith or incidental thereto.

Payment for pre-cast concrete forms will be at the price stipulated in Schedule Item 27 (g), which price shall be in full compensation for all concrete and mortar used in connection with making these forms and all expense in connection therewith or incidental thereto, as stipulated in the first paragraph of this section, but payment for the reinforcement placed therein will be made under Schedule Item 73 or 74.

Measurement for payment for galvanized steel inserts will be as provided in Section 85-15 and payment will be at the price stipulated in Schedule Item 86 (e).

ITEM 34—BRICK AND STONE MASONRY.

34-1. Bricks for masonry shall be of the best quality common bricks burned hard entirely through, regular and uniform in shape and size, and of compact texture. They shall be culled as they are brought on the work and, if necessary, gauged before laying. Bats and bricks of an improper quality shall be removed from the work, but a limited number of bats may be used under certain conditions in sewer work as hereinafter described. The proportion of bats to be allowed shall in all cases be as determined by the Engineer, but no bats smaller than a half brick shall be used. Bricks.

34-2. Mortar for laying brick, shall be composed of one (1) part cement and two (2) parts sand; for pointing, one (1) part cement and one (1) part sand; and for other classes of work, as directed by the Engineer. The kind and quality of the sand used for mortar, and the manner of measuring the volumes of cement and sand, shall be as specified for concrete. The ingredients of Mortar.

mortar shall be thoroughly mixed dry, after which sufficient clean, fresh water shall be added to form a stiff paste. Mortar that has begun to take an initial set shall not be used. Retempering mortar will not be permitted.

Laying  
bricks.

34-3. Bricks shall be laid to line with joints in the face work not exceeding one-quarter ( $\frac{1}{4}$ ) of an inch in the beds, and three-eighths ( $\frac{3}{8}$ ) of an inch on ends. The bricks shall be wet in an approved manner before laying and shall be completely embedded in mortar under the bottom and on the sides and ends at one operation, care being taken to have every joint full of mortar. All exposed surfaces shall be smooth and regular. Where required to make a neat joint in connection with steel framework, at corners, curves and similar places, special bricks of proper shape shall be furnished and used.

Centers  
and forms.

34-4. All centers and forms shall be made to fit the curves of the work and they shall be put up and removed in a manner satisfactory to the Engineer.

Exposed  
faces.

34-5. The exposed faces of all masonry arches and other masonry laid upon centers or forms shall be thoroughly cleaned and scraped free from projecting mortar immediately after the centers or forms are removed and shall be left in neat condition for pointing. Masonry not laid upon centers or forms shall have the face joints neatly struck when laid.

Joints with  
new work.

34-6. All unfinished work shall be racked back or toothed, as directed by the Engineer, and before new work is joined to it the joint shall be scraped entirely clean, scrubbed with a stiff brush and well moistened.

Precautions  
in freezing  
weather, etc.

34-7. The precautions to be observed in laying and protecting masonry during freezing weather, in protecting it during hot weather, in keeping it free from water and in protecting finished work in exposed situations, and the provisions in regard to water-tightness, shall be as specified for concrete.



34-8. Every joint that is to be pointed shall be raked out, within two days after being laid, to a depth of at least three-fourths ( $\frac{3}{4}$ ) of an inch, unless otherwise permitted. The joints shall be well wetted before pointing. The pointing mortar shall be packed tightly into the joint and smoothed off with a steel tool. No pointing shall be done in freezing weather, and masonry laid between December first and April first shall not be pointed until permitted by the Engineer.

Pointing.

34-9. Measurement for payment for brick masonry will be of the actual volume of brick masonry in place on the work within the net lines of the sections ordered and indicated on the drawings.

Measurement and payment, brick masonry.

Payment for brick masonry will be at the price stipulated in Schedule Item 34, which price shall be in full compensation for furnishing, placing and completing such brick masonry and all expense in connection therewith or incidental thereto, including scaffolding, forms, centers, placing and removing the same, pointing and protecting the finished work.

34-10. In case masonry of a different class from that specified above or special cut stone shall be required by the Engineer, the same shall be furnished and built according to specifications applicable to the best work of such class and will be paid for as provided in Schedule Item 300.

Masonry of other classes.

#### ITEM 36—GRANITE CURBING FOR TUNNEL ROADWAY.

36-1. All granite curbing for the tunnel roadway shall be medium grained, show an even distribution of constituent minerals, have a uniform appearance and quality, a dense granular texture, and be practically free from mica, without seams, scales or other discolorations showing disintegration. It shall be a true granite; gneiss rock will not be permitted. All granite furnished shall conform to the following requirements:

Granite.

Percentage of wear not more than 5;  
French co-efficient of wear not less than 8;  
Toughness not less than 7.

Methods of testing by the Engineer will in general conform to the methods recommended by the American Society for Testing Materials.

Contractor  
to furnish  
samples.

Before placing an order for granite, the Contractor shall furnish the Engineer with samples and test cubes for his approval, and after such approval, all granite must comply with these samples and with the plans and specifications.

Cutting of  
curbing.

36-2. The top and the face of all stones shall be dressed to a surface equal to four cut work. The stones shall be out of wind and the top and face shall have no depressions greater than one-quarter ( $\frac{1}{4}$ ) inch measured from a line or straight edge the same length as the stone where dressed. The remainder of the face shall have no projections or depressions greater than one-half ( $\frac{1}{2}$ ) inch. The back of the curbing shall be dressed one (1) inch down from the top so as to furnish an arris straight and true. The remainder of the back shall have no projections greater than one and one-half ( $1\frac{1}{2}$ ) inches or depressions greater than three-eighths ( $\frac{3}{8}$ ) inch. The bottom of the curbing shall be rough squared and have no projections or depressions greater than one (1) inch.

End joints.

The ends of the curb stones for their full width shall be dressed close jointed four (4) inches down from their top and for one (1) inch in from the face shall be dressed close jointed for the following depths:

For five (5) inch by fourteen (14) inch curbing,  
ten (10) inches.

For five (5) inch by sixteen (16) inch curbing,  
twelve (12) inches.

They shall be square to top and face with no depressions greater than three-eighths ( $\frac{3}{8}$ ) inch. The remainder of

the ends shall be dressed so that there shall be no depressions greater than one (1) inch.

Inlet openings are to be cut through the curbing to admit roadway drainage into the side drain. The surfaces of these openings are to be cut or dressed to a smooth finish.

Inlet openings.

The curbing shall be set with close joints and to line and grade as given by the Engineer, so that the front edge at the top shall present a fair and unbroken line and the face a plain surface with a batter of one-quarter ( $\frac{1}{4}$ ) inch in nine (9) inches. No curb stone of a length less than four and one-half ( $4\frac{1}{2}$ ) feet will be accepted.

Setting of curbing.

36-3. Measurement for payment for granite curbing will be of the actual number of lineal feet placed in the work and payment will be made at the price stipulated in Schedule Item 36, which price shall be in full compensation for furnishing and placing all granite curbing complete, and all expense in connection therewith or incidental thereto, including the dressing, cutting and fitting of the same. Concrete in foundations and backing will be measured as provided in Section 27-27, and paid for at the price stipulated in Schedule Item 27 (d). Anchor bolts will be measured as provided in Section 70-50, and paid for at the price stipulated in Schedule Item 70 (b).

Measurement and payment, granite curbing.

#### ITEM 37—HOLLOW TERRA COTTA TILE.

37-1. Hollow terra cotta tile shall be of the best porous terra cotta, as approved by the Engineer, and shall be of such thickness and shall be laid in such manner as hereinafter specified or as the Engineer may direct.

Hollow tile.

Measurement for payment for hollow terra cotta tile will be of the actual volume of such tile in place, and payment will be at the appropriate price stipulated in Schedule Item 37, which price shall be in full compensation for furnishing and laying the tile complete and all expense in connection therewith or incidental thereto.

Measurement and payment, hollow terra cotta tile.

## ITEMS 53-55—PILES AND CONCRETE PIERS.

Timber  
piles.

53-1. Timber piles shall consist of good, sound, white oak, yellow pine, spruce, or other acceptable timber, straight and free from splits, shakes or other imperfections impairing their strength or durability. They shall taper uniformly from butt to point and, if required, shall be barked. Every pile shall be so straight that a straight line between the centers of each end of the pile will be within the body of the pile; no reverse crooks will be admissible. All measurement of the diameter of the pile shall be exclusive of the bark. Unless otherwise shown on the plan they shall conform to the following dimensions:

| Length below cut off. | Minimum<br>diameter<br>at point | Minimum<br>diameter<br>at cut off |
|-----------------------|---------------------------------|-----------------------------------|
|                       | Inches.                         | Inches.                           |
| 15 to 20 ft.          | 6                               | 12                                |
| 50 to 70 ft.          | 6                               | 15                                |
| 70 to 75 ft.          | 6                               | 16                                |
| 75 to 85 ft.          | 6                               | 17                                |

The piles shall be driven by a method satisfactory to the Engineer, using a steam hammer, if required. If the driving so disturbs the ground as to bring unusual pressures on adjacent structures, jetting may be required. The points of the piles shall be protected by proper shoes and the butts by rings or caps if required by the Engineer.

Driving piles.

53-2. Timber piles shall be driven in the position and manner and to the depth ordered; if driven in a wrong position or injured in any way by driving they must be withdrawn and replaced by others. The piles shall be driven to rock bearing or to hard bottom, until the last ten (10) blows of a hammer weighing three thousand (3,000) lbs. falling freely from a height of fifteen (15) feet, or the equivalent, will not drive the piles more than one (1) foot. After being driven they shall be cut off to a true plane or otherwise prepared to receive capping timber or concrete.



53-3. Measurement for payment for timber piles will be made only of the actual lengths of piles remaining within the net width of the finished foundations and forming part of the completed work. Portions cut off, test piles, guide piles, or piles other than those that form a part of the finished foundation will not be estimated for payment, it being understood that the Contractor has made allowance therefor in the unit price. Payment for timber piles will be at the price stipulated in Schedule Item 53, which price shall be in full compensation for furnishing, driving and preparing the piles and all expense in connection therewith or incidental thereto.

Measurement  
and payment,  
timber piles.

55-1. Concrete pier foundations will be required under the structure in the vicinity of the land shafts, as shown on the drawings. These piers are to be sunk as compressed air caissons to a firm bearing in rock. It is expected that the piers will encounter in certain sections of the excavation rock-filled crib, and the cutting edge of the caissons shall be sufficiently strong to withstand the difficulties of such excavation. The concrete shall be permitted to obtain sufficient strength to withstand the stresses of sinking and special care shall be taken to secure watertight joints between successive lifts. The Contractor shall submit for approval detailed plans for doing this work. Every precaution shall be taken to protect and control the piers, using the necessary weighting, blocking, wedging, supports or other measures for guiding and stopping the pier so that when in final position no pier in its net height shall be more than twelve (12) inches out of plumb. The caissons in their final position shall be sealed to rock under compressed air. The working shaft shall later be filled with concrete.

Concrete  
piers.

55-2. Measurement for this work will be as provided in Sections 1-7, 1-9, 27-27 and 70-50, and payment therefor as provided in Schedule Items 5, 27(d) and 73. Separate payment will not be made for the steel in the working chamber but payment therefor is deemed to be included

in the unit price stipulated in the Schedule for caisson excavation.

ITEM 59—TIMBER CRADLES.

Timber.

59-1. All timber for cradles shall be long leaf yellow pine, or other acceptable timber and shall be sound, free from shakes, cracks, large or loose knots, or other defects impairing its strength or durability. It shall be squared to the required dimensions throughout its entire length.

Timber to be spiked or bolted.

59-2. Timber shall be placed where shown on the plans or as directed and shall be firmly spiked or bolted with approved nails, spikes or bolts of such size and length at such places and in such number as shown on the plans or as directed.

Measurement and payment, timber cradles.

59-3. Measurement for payment for timber will be made of the actual quantity of timber in place without allowance for blocking, wedges or for waste in cutting. Payment for timber will be at the price stipulated in Schedule Item 59, which price shall be in full compensation for furnishing and placing timber cradles complete, and all expense in connection therewith or incidental thereto, including fitting, wedging, blocking and fastening.

ITEMS 60-62—WATERPROOFING.

Type of waterproofing.

60-1. Waterproofing of the Tunnel will be as shown on the drawings or as local conditions may require as determined by the Engineer. All waterproofing shall be absolutely water-tight. In general it will be either one of two types.

Ply waterproofing.

Ply waterproofing will consist of treated fabrics together with coatings of asphalt placed on each side at the time of laying. The number of plies of fabric shall be as indicated on the drawings or as ordered by the Engineer.

The finished fabric shall be wound on a cylindrical core or spool of wood, fiber or other strong material not less than two inches (2") in diameter and equal in length

to the width of the fabric. The fabric shall be properly stored and protected against damage and shall unroll easily. Each roll shall be plainly marked with the manufacturer's name, indicating the kind, grade and quality of the material.

Brick in asphalt mastic will consist of one or more courses of brick laid in mastic to such thicknesses indicated on the drawings or ordered by the Engineer.

Brick in  
asphalt  
mastic.

The asphalt shall be delivered on the work in suitable containers plainly marked with the manufacturer's name and indicating the kind, grade and quality of the material.

Containers  
to be marked.

All tests herein specified for asphalt shall be conducted according to methods approved by the Engineer and on file in the office of the Commissions. In general, these methods are those adopted as standards by the American Society for Testing Materials.

Methods  
of tests.

60-2. Waterproofing fabric for ply waterproofing shall be a good grade of woven cotton fabric and before being brought on the work shall be treated with the asphalt specified in Section 60-3. In its raw or untreated state it shall contain no oils of any kind. It shall weigh not less than four and one-half ( $4\frac{1}{2}$ ) ounces nor more than six (6) ounces per square yard, and its thread count shall not be less than twenty-eight (28) or more than thirty-two (32) per inch in either direction. The fabric after treatment shall weigh not less than three times the weight of the untreated fabric, shall have a stretch of at least ten per centum (10%) in either direction, and the tensile strength shall be not less than sixty (60) pounds in either direction when tested by the "Grab Method," as adopted by the American Society for Testing Materials under the serial designation, D39-20.

Fabric.

60-3. Asphalt for ply waterproofing except as specified in Section 60-5 shall be prepared by the distillation and blowing of asphaltic petroleum, and shall comply with the following requirements:

Asphalt for  
ply water-  
proofing.

- Solubility.** The asphalt shall be free from coal tar pitch or any of its products and shall contain not less than ninety-nine per centum (99%) of bitumen soluble in cold carbon disulphide.
- Melting point.** The asphalt shall have a melting point as determined by the Ring and Ball Method between 150° and 175° F. and shall not flash below 400° F., when tested in a New York State Closed Oil Tester.
- Penetration.** The penetration of the asphalt shall be not less than 10 at 35° F., between 20 and 30 at 77° F. and not more than 100 at 115° F. The measure of penetration is the depth that a No. 2 Cambric needle sinks into the material in hundredths of centimeters. In making the test at 35° F., the needle shall be weighted to 200 grams and act for 1 minute, at 77° F. it shall be weighted to 100 grams and act for 5 seconds and at 115° F. it shall be weighted to 50 grams and act for 5 seconds.
- Ductility.** The ductility of the asphalt shall be not less than 3 centimeters at 35° F., not less than 20 centimeters at 77° F. and not less than 75 centimeters at 115° F. The rate of elongation shall be  $\frac{1}{4}$  centimeter per minute at 35° F., 5 centimeters per minute at 77° F. and at 115° F. The test shall be made upon a briquette of asphalt with a cross section of one centimeter square.
- Dow moulds shall be used in making specimens.
- Specific gravity.** The specific gravity of the asphalt shall be not less than 1.0 at 77° F.
- Loss on heating.** The loss on heating a 50 gram sample of the asphalt for 5 hours at a temperature of 325° F. shall not exceed one per centum (1%) by weight. The sample shall be heated in a cylindrical tin box of approximately two and three-sixteenth ( $2 \frac{3}{16}$ ) inches in diameter. The penetration of the residue at 77° F., after such heating, shall be not less than seventy-five per centum (75%) of the original penetration.

If required by the Engineer the asphalt must withstand without deterioration a test of immersion for seventy-two (72) hours or longer, in a twenty-five per centum (25%) solution of sulphuric acid.

Acid test.

60-4. Brick to be used in asphalt mastic shall be of the quality specified under Section 34-1 for brick masonry. The brick shall be heated to an even temperature and shall be thoroughly dry and warm at the time of placing in the work. Bricks which are blackened by soot shall not be used on the work. The method of heating and drying brick shall be subject to the approval of the Engineer. Each brick when laid shall be entirely surrounded with asphalt mastic.

Brick.

60-5. Asphalt for brick in mastic and for one (1) ply waterproofing used in connection with such brick and mastic shall consist of fluxed natural asphalt, asphalt prepared by steam distillation of asphaltic petroleum, or by the steam distillation and air blowing of asphaltic petroleum. The asphaltic materials used in its preparation and the methods of manufacture shall be subject to the approval of the Engineer. The asphalt shall be free from coal tar pitch or any of its products.

Asphalt for mastic.

Fluxed natural asphalt shall contain not less than ninety-five (95) per centum of bitumen soluble in cold carbon disulphide.

Solubility.

Steam distilled or steam distilled and air blown asphalt shall contain not less than ninety-nine (99) per centum of bitumen soluble in cold carbon disulphide.

The asphalts shall have melting points as determined by the Ring and Ball Method as follows:

Melting points.

Fluxed Natural Asphalt between 115° and 130° F.

Steam distilled asphalt or steam distilled and air blown asphalt between 125° and 140° F.



|                    |   |
|--------------------|---|
| Penetration.       | The penetration of the asphalts shall be not less than 10 at 35° F. and be between 50 and 75 at 77° F.  |
| Ductility.         | The ductility of the asphalts shall be not less than 30 centimeters at 77° F.   |
| Specific gravity.  | The specific gravity shall be not less than 1.00 at 77° F.  |
| Loss on heating.   | The loss on heating a 50 gram sample of the asphalts for 5 hours at a temperature of 325° F. shall not exceed one per centum (1%) by weight. The sample shall be heated in a cylindrical tin box of approximately two and three sixteenths ( $2 \frac{3}{16}$ ) inches in diameter. The penetration of the residue at 77° F., after such heating, shall be not less than sixty per centum (60%) of the original penetration.  |
| Asphalt mastic.    | Asphalt mastic shall contain not less than one-third ( $\frac{1}{3}$ ) asphalt, the other ingredients to be sand and limestone dust or sand and cement. The ingredients are to be in proportions governed by local requirements and weather conditions as approved by the Engineer. In melting and mixing the mastic its temperature shall not exceed 325° F. and its consistencies shall be as required by the Engineer.   |
| Concrete surfaces. | 60-6. All surfaces to which waterproofing is to be applied shall be made smooth and bevels or fillets of approved radius shall be provided where surfaces intersect. In general, such surfaces will be obtained by the use of concrete as shown on the drawings or as directed by the Engineer.   |
| Ply waterproofing. | In the case of ply waterproofing there shall be spread a layer of asphalt having a uniform thickness of not less than one-sixteenth ( $\frac{1}{16}$ ) inch, so as to form a complete covering without blow-holes. Kettles in which the asphalt is heated on the work shall be equipped with approved thermometers. The asphalt shall not be heated to a temperature of more than 325° F. The fuel for heating the asphalt shall be as nearly as practicable non-smoke pro- |

ducing, depending upon local conditions. Portable or non-portable heating containers may be used subject to the approval of the Engineer. Upon this layer of asphalt, while it is still melted, there shall be pressed into complete contact with it a layer of waterproofing fabric, consisting of sheets overlapping not less than four (4) inches on the long edges and not less than twelve (12) inches at the ends, with the laps laid in hot melted asphalt. Upon this layer of fabric there shall be spread a layer of asphalt as above specified, another layer of fabric added as above with laps to stagger with the laps of the previous layer of fabric; and the process shall be continued until such number of layers as may be required by the Engineer have been laid; finishing with a layer of asphalt.

One layer of ply waterproofing shall be laid against the prepared surface before laying brick and asphalt mastic.

Ply waterproofing with brick on mastic.

60-7. All surfaces shall be dry before waterproofing is attached. If, in the judgment of the Engineer, it is impracticable to have the surface dry, then there shall be first placed a layer of treated fabric, felt or other acceptable material, on the exposed surface of which shall be spread the first layer of asphalt. No specific payment will be made for furnishing and placing this layer of fabric but payment therefor is deemed to be included in the unit prices stipulated in the Schedule for waterproofing.

Waterproofing to be applied to dry surface.

In waterproofing the water shall be controlled so that work can be done in the dry. Where necessary, the Contractor, at his own expense, shall provide free drainage by pipe drains, hollow tile or broken stone, as approved by the Engineer.

60-8. In waterproofing side wall surfaces where ply waterproofing is used, unless otherwise permitted, the ends of the rolls of the bottom layers shall be carried up on the inside of the layers on the sides, and those of

Laps on side walls.

the roof down on the outside of the layers on the sides, so as to secure a full lap of at least eighteen (18) inches.

Joints with new work.

60-9. Where new waterproofing is joined to old, the surface of the old waterproofing at the junction shall be thoroughly cleaned and dried, shall be heated so as to soften the asphalt and in case of ply waterproofing shall be given a lap of at least eighteen (18) inches with the new waterproofing.

Junctions with other contracts and special types of waterproofing.

Where the waterproofing of the approach section to be built under this contract joins the cast-iron tunnel lining constructed under another contract, the waterproofing provided herein is to be carried back on the outside of the cast-iron tunnel lining after the hood of the shield is removed by the Contractor. Special waterproofing for joining the ventilation ducts with the land shafts and for floors under columns and elsewhere, shall be provided as shown on the drawings. Separate payment will not be made for the special work required but payment therefor is deemed to be included in the appropriate unit prices stipulated in the Schedule. Payment for furnishing and placing sheet lead will be made under Schedule Item 109.

Protection.

60-10. Waterproofing shall be carefully protected from injury after it is laid. To protect surfaces over which material is handled, a protective covering of concrete shall be placed as required by the Engineer. Any waterproofing damaged or found to leak shall be repaired or cut out and replaced at the expense of the Contractor. Exposed ends of waterproofing, if required, shall be temporarily protected with a covering of mortar or concrete without additional payment therefor.

Skilled labor to be employed.

60-13. None but competent men, especially skilled in work of this kind, shall be employed to lay the waterproofing.

Measurement for ply.

60-14. Measurement for payment for ply waterproofing will be made only of the actual net area covered by the number of plies ordered, no account being taken of

SPECIFICATIONS—STEEL AND IRON.

laps, except where full ply waterproofing is lapped upon brick in mastic waterproofing, it being understood that all excess materials, labor and other expense resulting from the requirement for laps have been estimated and provided for by the Contractor in the unit prices stipulated in the Schedule for waterproofing.

Payment for ply waterproofing will be at the price stipulated in Schedule Item 60, which price shall be in full compensation for furnishing and laying the waterproofing complete, and all expense in connection therewith or incidental thereto.

Payment for  
ply water-  
proofing.

Measurement for payment for waterproofing consisting of brick laid in asphalt mastic will be of the actual volume placed according to the lines indicated on the drawings or ordered by the Engineer; and payment therefor will be at the price stipulated in Schedule Item 62, which price shall be in full compensation for the waterproofing complete and all expense in connection therewith or incidental thereto, including all materials, laying and placing and removal of forms, and the one (1) ply waterproofing forming a part of such brick and mastic waterproofing.

Measurement  
and payment,  
brick in  
mastic.

Concrete used as waterproofing protection will be measured as provided in Section 27-27 and paid for at the price stipulated in Schedule Item 27 (d).

Measurement  
and payment,  
waterproofing  
protection.

ITEMS 70-95—STEEL AND IRON.

70-1. All steel and iron shall be fabricated in all respects according to general and detailed drawings furnished or approved by the Engineer. The Contractor shall be responsible for all errors which can be discovered by checking or examining the drawings.

According to  
drawings.

70-2. The workmanship shall be equal to the best practice in modern bridge work. All parts exposed to view shall be neatly finished.

Workman-  
ship.



Facilities for inspection.

70-3. The Contractor shall furnish, free of charge, all facilities for a thorough inspection of material and workmanship, including suitably equipped offices at the mills and at the shops, prepared specimens for testing, the use of a reliable testing machine and necessary assistance for testing, certified chemical analyses of material, copies in triplicate of all mill orders, complete copies in triplicate of all shipping invoices with each shipment showing the scale weight. The invoices for fabricated material shall show the scale weight of each individual piece. Access at all times shall be provided for the Engineer and Inspectors to any part of the plant or plants where any portion of the material is made or worked.

Notice for inspection.

70-4. No material shall be rolled nor work done without due notice to the Engineer so that he may arrange for inspection.

Rejection at shop.

70-5. Material which, subsequent to tests at the mills and its acceptance there, develops weak spots, brittleness, cracks or other imperfections or is found to have injurious defects will be rejected at the shop and shall be replaced by the Contractor at his own cost.

Rejection after acceptance.

70-6. The acceptance of any material or workmanship by an Inspector or his failure to notify the Contractor of defects in the same shall not prevent its subsequent rejection if found defective.

Protection.

70-7. All parts shall be carefully loaded, protected from injury during transportation and unloaded by such means as will be satisfactory to the Engineer. After delivery of materials at the work the Contractor will be required to store the same on skids at least twelve (12) inches above the ground and to keep the same in good condition. Any piece showing injurious effects of rough handling at any stage may be rejected.



SPECIFICATIONS—ROLLED STEEL.

70-8. All steel and iron shall be protected from the weather before erection and shall be cleaned of all dirt, rust and scale before being painted, waterproofed or encased in concrete. Painting of steel will be required as provided under Item 105.

Protection from weather.

Cleaned before using.

ITEMS 70-77—ROLLED STEEL.

70-9. Steel shall be made by the open-hearth process.

Open-hearth process.

70-10. The chemical composition of the finished material shall conform to the following limits. Steel for plates, bars and shapes shall not contain more than 4/100 of 1 per centum of phosphorus, nor more than 6/100 of 1 per centum of sulphur. Steel for rivets shall conform to the same limits, except that it shall not contain more than 5/100 of 1 per centum of sulphur.

Chemical composition.

70-11. Chemical determinations of the percentages of carbon, phosphorus, sulphur, manganese and silicon shall be made by the manufacturer from a test ingot, so taken during the pouring of each melt of steel as fairly to represent the melt. Three (3) copies of such analyses shall be furnished to the Engineer or his Inspector.

Chemical determinations.

70-12. By cropping ingots sufficient discard shall be made to insure sound material free from piping or excessive segregation. The material shall be finished straight and smooth and shall be free from all seams, flaws, cracks, defective edges or other defects. Any imperfection which may develop during the progress of the work will be sufficient cause for rejection.

Material to be sound.

70-13. A variation in weight or cross section of any piece of steel of more than two and one-half per centum ( $2\frac{1}{2}\%$ ) from that specified shall be sufficient cause for rejection, except in case of sheared plates exceeding one hundred (100) inches in width, where the variation may be five per centum (5%). In calculating weights of steel the weight of one (1) cubic foot will be taken at four hundred ninety (490) pounds.

Variation in weight.

Melt  
number.

70-14. Every finished piece of steel shall have the melt number and the name of the manufacturer stamped or rolled upon it. Bars for reinforcing concrete, rivet and lattice steel and other small parts may be bundled, with above marks on an attached metal tag.

Tensile and  
bending  
requirements.

70-15. Steel for plates, reinforcing rods, bars and shapes shall have an ultimate tensile strength of from 56,000 to 64,000 pounds per square inch, and steel for rivets shall have an ultimate tensile strength of from 46,000 to 54,000 pounds per square inch. All steel shall have a yield point at not less than fifty-five per centum (55%) of the ultimate tensile strength; a minimum percentage of elongation in eight (8) inches represented by the quotient of 1,500,000 divided by the ultimate tensile strength; shall exhibit a silky fracture; and shall be capable of being bent flat on itself when cold without sign of fracture.

Bending test  
for angles.

Angles three-quarters ( $\frac{3}{4}$ ) inch or less in thickness shall open flat, and angles one-half ( $\frac{1}{2}$ ) inch or less in thickness shall bend shut, cold, under blows of a hammer, without sign of fracture. This test shall be made only when required by the Inspector.

Number  
of tests.

70-16. At least one tensile and one bending test shall be made on specimens cut from the finished material of each melt. In case steel differing three-eighths ( $\frac{3}{8}$ ) inch or more in thickness is rolled from one melt, tests shall be made from the thickest and from the thinnest material rolled. Rolled steel shall be tested in the condition in which it comes from the rolls.

Test pieces.

70-17. Sample pieces for tensile and bending tests of plates, reinforcing rods, bars and shapes shall be cut from such portions of the finished product of each melt as the Inspector may designate and shall be stamped by him; they shall have both faces rolled and both edges milled to the usual form of a standard test specimen—one and one-half ( $1\frac{1}{2}$ ) inches wide on a gauged length

of nine (9) inches, or with both edges parallel. The area of the minimum section shall be not less than one-half ( $\frac{1}{2}$ ) square inch.

- |   |  |
|---|--|
| 70-18. Rivet rods shall be tested as rolled.  | Rivet rods.                            |
| 70-20. The yield point shall be that strain beyond which the elongation ceases to be proportional to the weight imposed and may be indicated by drop of beam. The speed of testing shall be governed by the Inspector.  | Yield point.                           |
| 70-21. Rivet steel, when nicked and bent around a bar of the same diameter as the rivet rod, shall give a gradual break and a fine, silky, uniform fracture.  | Rivet steel<br>nicking tests.          |
| 70-22. If the specimens tested as herein specified do not fulfill the requirements of these specifications, duplicate tests may be made at the discretion of the Inspector, who will select and stamp the duplicate test pieces. If these retests meet all requirements, the melt will be accepted. | Retests.                               |
| 70-23. Wire mesh or similar reinforcing material shall be of a quality, type and weight required by the Engineer.   | Wire mesh.                             |
| Rods and bars to be used for reinforcing concrete shall be deformed as approved by the Engineer; plain bars shall not be used. All reinforcing shall be fastened in place as required by the Engineer.  | Reinforcing<br>rods to be<br>deformed. |
| 70-24. Bent rods shall be bent uniformly to a template in a machine or press approved by the Engineer. They may be bent either at the shop or on the work. In special cases bending hot and annealing may be required.  | Bent rods.                             |
| 70-25. Rods and bars which are to be upset to receive a thread will be so shown on the drawings. Threads cut on steel shall be properly filleted.   | Upset for<br>threads.                  |
| 70-26. Steel, except in minor details, which has been partially heated, shall be properly annealed. Welds in steel will be allowed only under conditions approved by the Engineer.  | Annealing.                             |

- Straightening.** 70-27. All material shall be straightened in the shop before being worked in any way and again straightened after punching and before assembling, if required by the Engineer or his Inspector.
- Shearing and chipping.** 70-28. Shearing and chipping shall be neatly and accurately done. Sheared edges of plates exceeding five-eighths ( $\frac{5}{8}$ ) inch in thickness in main members shall be planed at least one-eighth ( $\frac{1}{8}$ ) inch.
- Lattice bars.** 70-29. Lattice bars shall have neatly rounded ends concentric with rivet holes.
- Bolt heads and nuts hexagonal.** 70-30. Nuts and heads of bolts exposed to view shall be hexagonal.
- Punching, reaming and drilling.** 70-31. All material up to a thickness of five-eighths ( $\frac{5}{8}$ ) inch may be punched without reaming. Material over five-eighths ( $\frac{5}{8}$ ) inch and not exceeding seven-eighths ( $\frac{7}{8}$ ) inch in thickness shall be sub-punched and reamed or drilled from the solid. Material over seven-eighths ( $\frac{7}{8}$ ) inch in thickness shall be drilled from the solid.
- Holes accurately spaced.** 70-32. All holes shall be accurately spaced and punched. The diameter of the punch shall not be more than one-sixteenth ( $\frac{1}{16}$ ) inch greater than the diameter of the rivet. The diameter of the die shall be as small as may be required to punch a clean hole.
- Sub-punching and reaming.** 70-33. When sub-punching and reaming are required, the punch used shall have a diameter not less than three-sixteenths ( $\frac{3}{16}$ ) inch smaller than the rivet. Holes shall then be reamed to a diameter not more than one-sixteenth ( $\frac{1}{16}$ ) inch larger than the normal diameter of the rivet. All reaming shall be done with twist drills after the material is assembled and firmly bolted together. The use of lubricants in reaming will not be allowed. No interchange of reamed parts will be permitted unless a reaming template is used.

70-34. All holes for field rivets, except where there are less than six (6) rivets in a group, shall be sub-punched and accurately drilled to an iron template fitted with bushings, or reamed and match marked while the connecting parts are temporarily assembled in the shop. All such holes shall be so indicated on the shop drawings.

Templates.

70-35. All burrs on rivet holes shall be removed.

Burrs removed.

70-36. The size of rivets, which shall be understood to mean the actual size of the cold rivet before heating, shall be as called for on the drawings or as directed by the Engineer.

Size of rivets.

70-37. Holes of built-up members when assembled must come truly opposite so that the rivets can be inserted without the use of drift pins. If any hole must be enlarged to admit the rivet it shall be reamed. Poor matching of holes will be cause for rejection.

Reaming after assembling.

70-38. Riveted members shall have all parts well pinned up and firmly drawn together with bolts well in advance of riveting. Surfaces of members inaccessible after assembling shall be painted.

Assembling.

70-39. Rivets when driven shall completely fill the holes and shall be machine driven wherever possible. They shall have full concentric heads or they shall be countersunk when so required. Rivet heads shall not be flattened to less than one-half ( $\frac{1}{2}$ ) the diameter of the rivet on the line of the shank, unless countersunk. Loose, burnt or otherwise defective rivets shall be cut out and replaced. In cutting out defective rivets, great care shall be taken not to injure the adjacent material and if necessary such rivets shall be drilled out.

Riveting.

70-40. Distances from centers of rivets to edges of sheared plates shall not be less than  $1\frac{1}{4}$ " for  $\frac{3}{4}$ " rivets and  $1\frac{3}{8}$ " for  $\frac{7}{8}$ " rivets; distances from centers of rivets to rolled edges shall not be less than  $1\frac{1}{8}$ " for  $\frac{3}{4}$ " rivets and  $1\frac{1}{4}$ " for  $\frac{7}{8}$ " rivets. The minimum pitch for  $\frac{3}{4}$ "

Rivet spacing.



rivets shall be  $2\frac{1}{2}$ " and for  $\frac{7}{8}$ " rivets  $2\frac{7}{8}$ ". When material is sub-punched and reamed the pitch for  $\frac{3}{4}$ " rivets may be made  $2\frac{1}{4}$ " and for  $\frac{7}{8}$ " rivets  $2\frac{5}{8}$ ".

Use of bolts  
in place of  
rivets.

70-41. Generally the use of bolts in place of rivets will not be permitted, but when bolts are so permitted to be used the holes shall be reamed parallel and the bolts turned to a driving fit with the threads entirely outside of the holes. Where bolts are used in place of rivets, washers not less than one-quarter ( $\frac{1}{4}$ ) inch thick shall be used under the nuts. Bolts must be thickly coated with red lead paint before insertion so as to seal the hole against moisture.

Finished  
members  
to be true.

70-42. Finished members shall be true and free from twists, bends or open joints.

Planing and  
facing.

70-43. Sheared ends of all abutting members shall be accurately planed or faced unless noted to the contrary on the drawings.

Girder details.

70-44. Stiffeners of plate girders and all end connections of girders and built-up sidewall columns shall be faced on the ends and brought to a true contact bearing with the flange angles. End stiffeners shall be set back one-quarter ( $\frac{1}{4}$ ) inch from the ends of the flange angles and the ends of the girders shall be milled flush with the backs of the stiffener angles, as required. Web splice plates and fillers under stiffeners shall be cut to fit within one-eighth ( $\frac{1}{8}$ ) inch of flange angles.

Web plates.

70-45. Web plates must not project beyond the flange angles nor be more than one-quarter ( $\frac{1}{4}$ ) inch back of face of angles.

Copper steel.

70-48. Copper steel shall be used as shown on the drawings or as ordered by the Engineer. It shall contain not less than twenty-five hundredths of one per centum (0.25%) of copper and not more than six hundredths of one per centum (0.06%) of sulphur and shall further conform to the physical properties specified in Section 70-15.

70-49. Nuts, bolts, rivets and other similar material shall be boxed or otherwise securely packed for shipment. The net weight shall be plainly marked upon every piece or package.

Steel bolts,  
etc., boxed  
and weighed.

70-50. Steelwork will be estimated for payment on the basis of the quantity actually placed in accordance with the drawings or orders to form a part of the completed work; except that steel pipe sewer will be estimated for steel furnished, separate payment will be made for laying under Item 134 and except that the steel of the caisson working chambers will not be separately estimated but payment therefor is deemed to be included in the unit price of the Schedule for caisson excavation. In case of steel rods, bars or wire mesh for reinforcing concrete, no payment will be made for fastenings and only such laps as are placed according to the directions of the Engineer will be estimated for payment. Weight for payment will be the invoice weight of all steel entering into each structure, except such payment weight shall not exceed the theoretical weight of the structure as computed from the drawings by more than two and one-half per centum ( $2\frac{1}{2}\%$ ). Air duct manhole frames and covers, including all bolts, fastenings and gaskets, will be estimated as one unit for each complete set. Payment for steel work so estimated will be at the price stipulated in Schedule Item:

Measurement  
and payment,  
rolled  
steelwork.

70. (a) For built-up steel work and tie rods;

(b) For bolts, including anchor bolts, and such miscellaneous malleable iron castings and wrought iron fixtures, including ladders and hand bars, either in the Tunnel or in sub-surface structures (but not including pipe) as are not specifically provided to be paid for in other classified unit items;

72. For steel beams and shapes, with or without connections or other details;

- 73. For steel rods and bars for reinforcing concrete;
- 74. For wire mesh;
- 75. For special steel structures as follows:
  - (f) For air duct manhole frames with covers complete;
  - (g) For furnishing new riveted steel pipe sewer required; or
- 77. (a) For copper steel plates, bolts, nuts and washers;

which price shall be in full compensation for furnishing and erecting or placing the steel complete and all expense in connection therewith or incidental thereto, except the steel for riveted steel pipe sewers as herein otherwise provided, including fitting, riveting, caulking, bolting, cleaning and painting where required.

Payment for riveted steel, special steel structures.

Payment for riveted steel pipe sewers shall be in full compensation for furnishing such pipe on the work and all expense in connection therewith or incidental thereto, but payment for laying this pipe will be made under Item 134, as hereinafter provided.

ITEM 81—WROUGHT IRON.

Character and finish.

81-1. All wrought iron shall be double rolled, tough, fibrous and uniform in character. It shall be thoroughly welded in rolling and free from surface defects.

Tests.

81-2. The methods specified for testing rolled steel shall apply generally to wrought iron. Standard test specimens shall show an ultimate tensile strength of at least fifty thousand (50,000) pounds per square inch, and an elongation of at least eighteen per centum (18%) in eight (8) inches, with fracture wholly fibrous. Specimens shall bend cold, with the fiber, through one hundred

and thirty-five degrees ( $135^{\circ}$ ), without sign of fracture, with inner radius not to exceed the thickness of the piece tested. When nicked and bent the fracture shall be at least ninety per centum (90%) fibrous.

## WROUGHT-IRON AND STEEL PIPE.

81-3. Standard wrought-iron pipe, black or galvanized, shall be made of genuine wrought iron, no scrap or steel whatever being used, and shall be rolled to uniform gauge throughout. Standard welded steel pipe, black or galvanized, shall be made of soft weldable steel rolled from solid ingots. Sufficient crop shall be cut from the ends of wrought-iron or welded steel pipe to insure sound materials. All pipes shall be butt-welded or lap-welded as called for by the Engineer.

Wrought-  
iron and  
steel pipe.

All pipes shall have a smooth surface, free from injurious rust, mill scale, sand marks, cracks, laminations, blisters, cinder patches, bends or imperfect welds, or any other defects which would affect its strength or cause corrosion. It shall be free from bends, kinks, buckles and evidences of injury in manipulation or unequal contraction in cooling. Ordinary liquor marks, incident to manufacturing of welded material, shall not be cause for rejection. All standard pipe shall be tested at the mill to a minimum internal hydrostatic pressure of six hundred (600) pounds per square inch. All pipes shall have the ends smoothly and squarely cut and all burrs removed by reaming or otherwise. Both ends of each length of pipe shall be threaded to fit pipe couplings with standard taper threads. All threads shall be full and clearly cut. The axis of the thread shall correspond with the axis of the pipe and no appreciable shoulder shall be left after threading. When galvanized pipe is called for it shall be furnished galvanized by the hot process only both on the inside and outside. All couplings, elbows, plugs, etc., furnished with galvanized pipe shall be galvanized in the

same manner. Each length of pipe shall be permanently marked so as to show the mill at which it was fabricated. Pipes smaller than two (2) inches in diameter may be shipped in bundles with the above statement marked on tags tied to each bundle. Samples of galvanized pipe and fittings must successfully withstand the tests called for in Section 85-1.

Placing and testing pipe.

All pipe placed in the tunnel shall be securely fastened or otherwise supported in an approved manner and all joints shall be made with standard couplings sufficiently tight to withstand a pressure of at least two hundred (200) pounds per square inch. At the time of placing, the pipe shall be tested to the pressure mentioned above in such lengths as may be required by the Engineer. After the system is partially or wholly completed it shall be thoroughly flushed out and all hydrants opened and closed under pressure so as to thoroughly test the completed portion of the system. Prior to final acceptance all lines shall again be tested to the pressure required above.

Wrought-iron fittings.

Miscellaneous wrought-iron fittings shall be furnished and placed as shown on the drawings or as required by the Engineer.

Measurement and payment, wrought-iron and steel pipe.

81-5. Weight for payment of new wrought-iron and steel pipe required in the tunnel, or for making sub-surface changes will be the invoice weight of all pipe and pipe connections, including couplings, wyes, tees (but not furnishing valves), and all other specials required. Payment therefor will be at the price stipulated in Schedule Item 81, which price shall be in full compensation for furnishing and placing the pipe complete and all expense in connection therewith or incidental thereto.

#### ITEMS 85-86—GALVANIZED METAL.

Physical requirements.

85-1. All metal to be galvanized, before being galvanized, shall meet all requirements for iron or steel herein specified.



The term galvanized means coating the surface of the iron or steel with zinc by processes generally known as the hot process or the electroplating process. The galvanizing baths shall contain pure zinc only without the mixture of any other metal. Metal to be galvanized shall, after being thoroughly cleaned, pickled and dried, be evenly and heavily coated with zinc, which shall be free from buckles, blisters, pinholes, ragged edges or other defects. Galvanizing shall not be done until the articles to be galvanized have been completely fabricated. Samples of galvanizing shall successfully withstand four consecutive immersions of one minute each in a solution of copper sulphate crystals having a specific gravity of  $1.186 \pm .003$  at  $65^{\circ}\text{F}$ .

85-3. The conduits for electric wires, unless otherwise specified, shall be of rigid type, made of wrought iron or welded steel, as specified in Section 81-3, galvanized inside and outside. The inside shall be further protected by a coat of approved enamel. All conduits shall be threaded before galvanizing and shall have such allowance in the threads as will permit them to be screwed together after galvanizing without re-cutting the threads. The material shall comply with the requirements of the Underwriters' Laboratories of the National Board of Fire Underwriters (Nov. 1917 Edition). The conduits shall be built in or on the walls or roofs or other parts of the tunnels. The Contractor will not be required to furnish or place wires or cables in these conduits. The installation shall comply with the requirements of an electrical installation of the highest grade.

85-4. Electric conduits shall be delivered on the work in bundles of standard length pipe, each length marked with the trade mark of the manufacturer. They shall bend cold ninety degrees ( $90^{\circ}$ ) about a radius equal to ten (10) diameters without flaw or fracture. Samples of conduits and boxes shall be submitted for approval before they are purchased for the work.

Quality.

Placing and  
cleaning.

85-5. Most conduits will be imbedded in concrete or masonry, but portions of the runs may be left exposed. All conduits shall be carefully cleaned both before and after placing, all ends shall be reamed free from burrs and inside surfaces shall be free from all imperfections which might injure the cable.

Support and  
protection.

85-6. Conduits built into concrete or other parts of the structure shall be properly supported and protected so as to prevent their injury by subsequent operations. Conduits not built into the structure shall be supported by approved pipe straps located not more than eight (8) feet apart, or in such other manner as designated by the Engineer, and shall be kept boxed or otherwise suitably protected from injury.

Joints.

85-7. All joints shall be made with standard couplings (galvanized) and well treated with red lead. All threads cut on conduit while being placed shall be given a coat of rust-resisting zinc paint. All free ends shall be threaded and capped, and all connections shall be water-tight.

Bends and  
offsets.

85-8. Bends and offsets may be made on the work if proper tools are used, but in no case shall deformed, split or crushed conduits be used. All bends shall be of as large a radius as possible. Not more than two (2) right-angle bends shall be made between any two (2) outlet boxes unless permitted by the Engineer.

Conduits to  
terminate in  
outlet boxes.

85-9. Conduits imbedded in concrete or masonry shall be brought outside such concrete or masonry at the ends of the runs and shall terminate in outlet boxes or in threaded ends properly protected and located as shown on the drawings or as required by the Engineer.

Testing.

After the conduit installation is finished with pull and outlet boxes complete and the concrete has been poured and set, all conduit runs shall be tested by pulling through each a 20' length of 3 wires of the following sizes:

|                 |         |        |      |        |
|-----------------|---------|--------|------|--------|
| $\frac{3}{4}$ " | conduit | No. 10 | wire | A.W.G. |
| 1"              | "       | "      | 8    | "      |
| 1½"             | "       | "      | 1    | "      |
| 2"              | "       | "      | 000  | "      |

The wires shall comply with the requirements of the National Electric code for rubber insulated wire.

85-10. Pull and outlet boxes and boxes for lights shall be of cast iron galvanized inside and outside. The 6" x 10" x 4" and the 8" x 12" x 4" boxes shall be provided with a one-piece felt gasket cemented to the box. Outlet boxes shall be of the subway type.

Pull and outlet boxes and boxes for lights.

All one-quarter ( $\frac{1}{4}$ ) inch tapped holes in boxes for lights shall be filled with well greased tap screws, which do not project beyond the bottom flanges of the castings. These holes are to be drilled to a master template furnished by the Commissions, and are to be accurately spaced in accordance with this template.

Tapped holes in boxes for lights.

85-12. Conduits will be measured for payment at their actual length in place in the work, without deduction for space occupied by pull, outlet or junction boxes, and payment therefor will be at the price stipulated in Schedule Item 85, which price shall be in full compensation for furnishing and placing such conduits complete and all expense in connection therewith or incidental thereto, including bending, cleaning, testing, attachments, connections and boxing.

Measurement and payment, conduits.

85-13. Pull and outlet boxes and boxes for lights, in place and connected, will be estimated for payment at the number of each so placed in accordance with the drawings or orders, and payment therefor will be at the price stipulated in Schedule Item 86 (a) for outlet boxes, in Schedule Items 86 (b), 86 (c), 86 (d) and 86 (f) for pull boxes and in Schedule Item 86 (g) for boxes for lights, which prices shall be in full compensation for furnishing and placing such boxes complete and all ex-

Measurement and payment, pull and outlet boxes and boxes for lights.

penses in connection therewith or incidental thereto, including attachments and connections.

Measurement  
and payment,  
miscellaneous  
galvanized  
iron fixtures.

85-15. Miscellaneous galvanized iron fixtures, including galvanized steel guards (curb guards) and inserts, will be estimated for payment on the basis of the quantity actually placed in accordance with the drawings or orders. Weight for payment will be the actual weight in place. Payment for miscellaneous galvanized iron fixtures will be at the price stipulated in Schedule Item 86 (e), which price shall be in full compensation for furnishing and placing the fixtures complete and all expenses in connection therewith or incidental thereto.

ITEMS 90-95—CAST IRON.

Chemical  
properties.

90-1. Cast iron shall be tough gray iron made from iron remelted in a cupola or air furnace and shall contain not more than six-tenths of one per centum (0.6%) of phosphorus and not more than twelve hundredths of one per centum (0.12%) of sulphur. First-class machinery scrap approved by the Engineer to the amount of thirty per centum (30%) of the total melt may be used, but no mill cinder, white or burnt iron, or any other scrap iron will be permitted in the composition.

Bending test.

90-2. The strength of the iron entering into castings shall be determined by means of the "Arbitration Bar." This bar is to be one and one-quarter ( $1\frac{1}{4}$ ) inches in diameter and fifteen (15) inches long, cast vertically under the same circumstances as those which attended the casting of the full-sized piece. This bar shall sustain at the center, when resting upon two dull knife edges twelve (12) inches apart, a load of three thousand (3,000) pounds with a deflection of at least one-tenth ( $1/10$ ) inch before rupture.

Two (2) sets of two (2) bars shall be cast from each heat, one set from the first and the other set from the last iron entering into the castings. Each set of two (2) bars shall be made in a single mold.



The chemical and physical properties specified in Sections 90-1 and 90-2 do not apply to cast-iron pipes, pull boxes, outlet boxes, boxes for lights and exhaust air ports.

90-3. Castings shall be made with a sinking-head sufficiently high to insure sound metal throughout. They must have clean, smooth surfaces and must be free from blow holes, cold shuts, flaws, fins and surface imperfections. Castings having blow holes plugged will be rejected. Castings shall be straight and free from wind and shall conform accurately to the form and dimensions shown on the drawings. Each casting shall have its distinguishing letter or number cast in it as indicated on the drawings. All castings shall be neatly chiseled, and wire-brushed, dressed, sand blasted or cleaned by other approved methods and machined as required before leaving the foundry. Where required, castings shall be coated as specified in Section 91-1. Each casting shall be weighed after being machined and the weight distinctly marked on it in white paint.

Soundness  
and finish.

90-15. The actual finished weight of any casting, except as otherwise specified for pipes in Section 91-18, shall differ by not more than two and one-half per centum ( $2\frac{1}{2}\%$ ) from the Engineer's calculated weight. In calculating weights, the weight of one (1) cubic foot of cast iron will be taken at four hundred fifty (450) pounds.

Variation in  
weight.

#### CAST-IRON PIPE AND SPECIAL CASTINGS.

91-1. New cast-iron pipe, except gas pipe and special pipe used in subsurface changes, shall conform to the Standard Specifications for Cast-Iron Pipe and Special Castings of the American Water Works Association, adopted May 12, 1908, in all cases not specifically covered by the specifications herein.

New pipe.

For gas pipes and special pipes, the weights and all other requirements shall be in accordance with the standard specifications and requirements of the owners of such



pipes, but weight for payment will be estimated in accordance with the provisions of this Item.

Hubs and  
spigots.

91-6. The hub or socket and the spigot ends of pipe used in subsurface structures shall be shaped in exact conformity with the standards of the owners or the City Department having jurisdiction over the same, and will be tested by circular gauges.

General  
requirements

91-9. The thickness and weights of all subsurface pipe, methods of laying and testing and all other requirements for such pipe shall conform strictly to the standard requirements of the owners or the City Department having jurisdiction over the same.

Distinguish-  
ing mark.

91-14. All castings shall have the year in which they are cast, the running number of the castings of the same size and form, the letters H. R. V. T., and the name of the foundry where cast, cast on the outer side in raised letters not less than two (2) inches in length and one-eighth ( $\frac{1}{8}$ ) inch in relief, as required by the Engineer.

Variation  
in weight.

91-18. Any straight pipe, the weight of which is deficient by more than the following stated percentage of the standard weight, will be rejected:

For pipe 16 inches or less in diameter, 5%.

For pipe over 16 inches in diameter, 4%.

Excess weight in any one pipe not exceeding the above stated percentages will be estimated for payment when payment for pipe is made by weight. The total weight, to be estimated for payment, however, shall not exceed, for each size of pipe received, the sum of the standard weights of the same number of pieces of the given size by more than two per centum (2%).

(The term "standard weight" as above used in connection with straight pipe shall be taken to mean the standard weight corresponding to the actual laying length of the pipe as furnished.)

Any special casting, the weight of which is deficient by

more than the following stated percentages of the standard weight, will be rejected:

For special castings 12 inches or less in diameter, 10%.

For special castings over 12 inches in diameter, 8%.

Excess weight in any one special casting, not exceeding the following stated percentages, will be estimated for payment when payment for pipe is made by weight:

For special castings 12 inches or less in diameter, 8%.

For special castings over 12 inches in diameter, 6%.

The total weight to be estimated for payment, however, shall not exceed, for the special castings received, the sum of the standard weights of the same number of special castings by more than five per centum (5%).

91-22. Stop cocks, boxes, branches, curved pipe and other specials required for new pipes shall be furnished and set where necessary according to the standards of the City Department having jurisdiction over the same, or in the tunnels as required by the Engineer.

Specials.

91-23. Each pipe shall be properly supported on blocks and wedged to the required elevation as directed by the Engineer.

Supporting pipes.

91-24. The spigot end of the pipe shall be inserted into the hub to within from one-fourth ( $\frac{1}{4}$ ) to one-eighth ( $\frac{1}{8}$ ) inch of the full depth of the hub, and the space around the pipe shall be equalized so as to give as nearly as possible an equal space for the packing. The space between the pipe and hub shall be packed with clean, sound jute, hemp or sisal packing yarn, free from tar, far enough to leave the proper space for lead. The remaining space shall then be filled by running it full of lead, leaving a bead outside of the face of the hub large enough to allow for thorough caulking. After the joint shall have been run with lead, it shall be caulked by means of proper tools so as to make a water-tight joint.

Joints.

SPECIFICATIONS—MISCELLANEOUS CASTINGS.

|                                       |   |
|---------------------------------------|---|
| Lead.                                 | 91-25. The lead to be used for caulking shall be of the quality specified in Sections 109-1.  |
| Payment weight.                       | 91-26. Weight for payment will be the invoice weight of all pipe and special castings entering into the structure, subject to the limitations of Section 91-18 as to excess weight.   |
| Payment for pipe.                     | 91-27. Payment for furnishing new cast-iron pipe required to change subsurface structures, and having either bell and spigot or universal joints, including both straight pipe and special castings, will be at the price stipulated in Schedule Item 91 or 92. |
| Payment for gate valves and hydrants. | 91-29. Payment for furnishing new valves or hydrants, not otherwise herein provided for, will be made as provided in Schedule Item 300.   |
| Payment, Lead.                        | 91-30. Separate payment for lead used in caulking cast-iron pipe will not be made, but payment therefor is deemed to be included in the appropriate unit prices stipulated in the Schedule.   |

MISCELLANEOUS CASTINGS.

|  |  |
|--|--|
| Payment for gratings and miscellaneous castings. | 95-1. Payment for furnishing and placing new cast-iron manhole and catch basin fixtures, gratings, drain covers, exhaust air ports and castings not otherwise provided for, but not including pipe or pipe fittings, will be at the prices stipulated in Schedule Item 95, which price shall be in full compensation for furnishing and placing the castings complete, and all expense in connection therewith or incidental thereto, including gaskets.   |
| Tapped holes in exhaust ports.                   | All five-sixteenths (5/16) inch tapped holes in cast-iron exhaust ports shall be filled with well greased tap screws which do not project beyond the bottom flanges of the casting. Tapped holes are to be provided with corks where called for on the drawings. Slots for bolts in exhaust air castings shall be filled flush with the surface with wood or other approved filling to prevent the entrance of concrete during concreting operations. All tapped holes are to be drilled to a master template fur- |

nished by the Commissions, and are to be accurately spaced in accordance with this template.

Payment for furnishing and placing cast-iron exhaust air ports will be at the price stipulated in Schedule Items 95 (b) or 95 (c), which price shall be in full compensation for furnishing and placing the castings complete, including drilling, tapping and filling of holes as required.

Payment, cast-iron exhaust air ports.

ITEM 100—TUNNEL SERVICE PIPE.

100-1. Cast-iron water, discharge and other tunnel service pipe shall conform to the requirements for cast-iron pipe as specified in Sections 91-1 to 91-24, inclusive. It shall be laid to the line and grade furnished by the Engineer, shall be caulked with lead as specified in Sections 91-24 and 91-25 and shall be tested in place under hydrostatic pressure to two hundred (200) pounds per square inch in accordance with the methods prescribed in Section 81-3. If the pipe is encased in concrete, the hydrostatic test shall be applied before the concrete is placed.

Cast-iron tunnel service pipe.

100-2. Cast-iron water, discharge and other tunnel and shaft service pipe, including bell and spigot elbows and tees, flanged, faced and drilled elbows and tees, and all other specials, located within the ordered net lines of excavation for the tunnel structure, will be measured for payment at the actual length as laid, without deduction for space occupied by valves, and payment therefor will be at the appropriate price stipulated in Schedule Item 100, which price shall be in full compensation for furnishing and placing the pipe lines complete and all expense in connection therewith or incidental thereto, including wyes, tees and other specials, capping of dead ends, setting valves and traps (but not furnishing valves and traps), caulking, testing and making connections with the water main, sewer or other pipe.

Measurement and payment for cast-iron tunnel service pipe.

Cast-iron tunnel service pipe, located outside the ordered net lines of excavation for the tunnel structure, as shown on the drawings, will be paid for at the appropriate prices stipulated in this item, except that additional pay-



ment will be made for excavation and surface restoration in the manner provided under Items 120 or 122 for sub-surface changes.

Payment for  
valves and  
traps.

100-3. Payment for furnishing valves, meters and traps together with their connections and nipples will be made as provided in Schedule Item 300.

#### ITEM 105—PAINTING.

Shop coat.

105-5. The shop coat for steel shall be a red lead paint and shall be mixed in the proportion of 500 pounds of red lead to 5½ gallons of boiled linseed oil, and 11 gallons of raw linseed oil. The paint shall be mixed as needed, in such quantities as can be used before it thickens in the container.

Raw linseed  
oil.

105-6. Raw linseed oil shall conform to the specifications of the American Society for Testing Materials for the purity of raw linseed oil from North American Seed, as revised in 1915.

Boiled linseed  
oil.

Boiled linseed oil shall conform to the specifications of the American Society for Testing Materials, adopted in 1915. When boiled linseed oil is flowed over a plate of glass and allowed to drain in a nearly vertical position, it shall dry free from tackiness in fifteen (15) hours at 70° F.

Red lead.

105-7. Red lead shall be of the best quality, free from all adulteration and shall contain not less than 80% nor more than 90% "true red lead" ( $\text{Pb}_3\text{O}_4$ ), not over 1% inert hearth materials (such as silica and alumina) and not more than 0.1% metallic lead; the remainder shall be pure lead monoxide ( $\text{PbO}$ ). It must contain no organic coloring matter and when shaken up with water shall show no alkaline reaction. It shall be of such fineness that 99½% will pass through a standard 200 mesh sieve.

Field coats.

105-8. Where required, one or more field coats shall be applied in addition to the shop coat; the paint for such field coats shall be of a kind, quality and color to be approved by the Engineer. Their manufacture shall conform to the best accepted practice.



105-13. All surfaces of metal which come in contact or are enclosed shall be scraped free from scale and rust, and painted with red lead paint before assembling; and all surfaces which come in contact in erection shall be painted with red lead paint. All turned or faced surfaces shall receive a coat of white lead and tallow before leaving the shop.

Shop painting.

All contact surfaces of field connections shall receive one additional coat of red lead paint immediately before erection.

Painting field connections.

105-17. Paint shall be subject to inspection at the place of manufacture and to such tests as may be ordered by the Engineer. The Inspector shall have access, at all times, to all places to inspect the methods of manufacture, and shall have liberty to inspect the daily laboratory records and analyses of all such paints as are subject to his inspection.

Inspection.

The Contractor shall furnish all facilities required for the proper inspection of the paint and its manufacture. All containers will be sealed by the Inspector at the time of inspection.

All materials for shop coat shall be delivered, inspected and sampled in their original packages.

Samples from original packages.

105-20. Painting in rainy or freezing weather or on wet or damp surfaces will not be permitted.

When painting not permitted.

105-21. Payment for painting is deemed to be included in the prices stipulated in the Schedule for steel and iron.

Payment.

#### ITEM 108—BRONZE AND BRASS.

108-1. All bronze used on the work shall be Government bronze, and shall conform to the following requirements:

Chemical composition, bronze.

|         |               |     |               |     |
|---------|---------------|-----|---------------|-----|
| Copper, | not less than | 86% | nor more than | 89% |
| Tin,    | “ “ “         | 8%  | “ “ “         | 11% |
| Zinc,   | “ “ “         | 1%  | “ “ “         | 3%  |

SPECIFICATIONS—LEAD

An analysis of each melt shall be made by the manufacturer, and the chemical composition thus determined shall be reported to the Engineer.

Physical requirements, bronze.

108-2. All bronze shall have an ultimate tensile strength of not less than 30,000 pounds per square inch, an elastic limit of not less than one-half ( $\frac{1}{2}$ ) the ultimate tensile strength and an elongation of not less than twenty-five per centum (25%) in two (2) inches.

Physical requirements, bronze and brass.

108-3. All brass used on the work shall be of a quality, type and weight required by the Engineer.

No patching or plugging.

108-4. No patching or plugging of castings will be allowed and all bronze shall be cast in molds which are absolutely dry. No cold working of bronze will be permitted.

Measurement for payment, bronze and brass.

108-5. Bronze or brass will be estimated for payment on the basis of the quantity actually placed in the work, in accordance with the drawings or orders, provided, however, that the total weight estimated for payment shall not exceed the theoretical weight as computed by more than five per centum (5%). In calculating weights, the weight of one (1) cubic foot of bronze will be taken at five hundred thirty-five (535) pounds.

Payment for bronze.

Payment for bronze will be at the price stipulated in Schedule Item 108 (a), which price shall be in full compensation for furnishing and placing the bronze complete and all expense in connection therewith or incidental thereto.

Payment for brass.

Payment for brass will be at the price stipulated in Schedule Item 108 (b), which price shall be in full compensation for furnishing and placing the brass complete and all expense in connection therewith or incidental thereto.

ITEM 109—LEAD.

Sheet lead.

109-1. Sheet lead is to be made from new pig lead and shall contain not less than ninety-nine and one-half per

centum (99½%) of metallic lead. The surface of the sheet lead shall be smooth and unbroken and the thickness shall be uniform.

109-3. Sheet lead used for waterproofing shall be placed, if possible, without joints. Where it is necessary to join separate sheets, this shall be done by fusing or soldering in such a manner as to produce a water-tight sheet of uniform thickness. Placing.

109-4. Sheet lead will be estimated for payment on the basis of the quantity actually placed in the work, in accordance with the drawings, or as ordered, provided the total weight estimated shall not exceed the theoretical weight as computed by more than five per centum (5%). In calculating weights, the weight of one (1) cubic foot of lead will be taken at seven hundred ten (710) lbs. Measurement, sheet lead.

109-5. Payment for sheet lead will be at the price stipulated in Schedule Item 109 (a), which price shall be in full compensation for furnishing the sheet lead complete in place and all expense in connection therewith or incidental thereto, including fitting, fusing and soldering. Payment, sheet lead.

#### ITEM 110—TUNNEL DUCTS.

110-1. The specifications of this Item relate to vitrified or fiber ducts to contain electric cables or other cables or wires. Except where specified to the contrary ducts shall be vitrified. Such ducts are referred to in the Schedule and elsewhere herein as tunnel ducts. Tunnel ducts.

110-2. Tunnel ducts shall be manufactured of the best clay, thoroughly mixed, burned and vitrified, sound in all respects, straight, free from soft spots, stones, cracks, blisters and other defects liable to impair their strength, durability, or non-conductivity. They shall be thoroughly and completely glazed, inside and outside, with good salt glaze. The interior surfaces shall be smooth and free from any projections or imperfections which may tend to injure the electric cable when being pulled Quality, soundness and finish.

through the duct. The ends shall be cut smooth and square with the axis. The ends of the holes shall be beveled on the inside for three-fourths ( $\frac{3}{4}$ ) inch.

Faces combed. 110-3. Single way ducts shall be combed on each face with at least five (5) longitudinal combings, each combing to have a width of one-quarter ( $\frac{1}{4}$ ) inch and a depth of one-sixteenth ( $\frac{1}{16}$ ) inch.

Length. 110-4. Multiple ducts shall have a standard length of thirty-six (36) inches, and single ducts, a standard length of eighteen (18) inches. Shorter lengths shall be used only as directed.

Holes circular and rectangular. 110-5. Duct holes shall be of such diameter as to pass a cylindrical mandrel three and one-half ( $3\frac{1}{2}$ ) inches in diameter, for circular openings, and three and one-half ( $3\frac{1}{2}$ ) inches square with one-fourth ( $\frac{1}{4}$ ) inch rounded corners for rectangular openings; in each case the mandrel being the full length of the duct.

Thickness. 110-6. The walls of single ducts shall be not less than five-eighths ( $\frac{5}{8}$ ) inch thick, and the outside dimensions shall be not less than five (5) inches nor more than five and one-quarter ( $5\frac{1}{4}$ ) inches measured at right angles to the flat of each side.

The outside walls and webs of four-way ducts shall be three-fourths ( $\frac{3}{4}$ ) inch thick and the outside dimensions shall be not less than nine and one-quarter ( $9\frac{1}{4}$ ) inches nor more than ten (10) inches, and the outside walls shall be constructed square on outer lines. The two-way, three-way and six-way ducts shall be consistent with the above.

Laid to line. 110-7. The ducts shall be laid with staggered joints and so that the center of the holes are true to line and grade.

Laying. 110-8. The ducts shall be laid in beds of cement mortar about one-quarter ( $\frac{1}{4}$ ) inch in thickness, with broken joints and with full bearing.



A strip of muslin four (4) inches wide, coated with neat cement mortar, asphalt or other approved material, shall be used to wrap each joint, the ends of the wrap to lap four (4) inches. The muslin shall have a thread count not less than 56 x 60 per square inch and a weight not less than four (4) ounces per square yard.

In laying the ducts, care must be taken to close abutting joints so that the ends of ducts shall be as nearly as practicable in contact on all sides. Where ducts are laid on curves, the wraps must be doubled, if required, to protect the openings between the ends of the ducts on the outer line of the duct and to exclude all mortar from duct openings.

Steel straps as shown on the drawings shall be used for bonding.

Steel bonding straps.

110-9. The ducts shall be laid with a link mandrel, of length and diameter to be prescribed, accurately fitting the duct openings and equipped to remove all loose material remaining in the ducts. The mandrel shall be left in each duct until the next succeeding duct is laid.

To be laid with mandrel.

110-10. Multiple ducts shall be laid with dowel pins as required.

Multiple ducts.

110-11. After the concrete covering has been placed over the ducts and set they shall be rodded so as to remove all mortar and other foreign matter from the duct openings, leaving them clear and smooth. If obstructions are found, in rodding the ducts, which cannot be removed by cleaners so as to give a clear and smooth opening sufficient to pass a three and one-quarter ( $3\frac{1}{4}$ ) inch mandrel of approved design, the ducts shall be removed and relaid. All ducts, immediately after laying and again after being rodded, shall be plugged with suitable plugs to be furnished by the Contractor at his own expense. If wooden plugs are used, they shall be impregnated with paraffine or other approved material before being put into place.

Rodding and plugging.

Fiber ducts

110-12. Fiber ducts shall be composed of wood pulp properly impregnated with a bituminous product which is free from vegetable matter and capable of withstanding a temperature of 80° C. without softening. The inside diameter shall be four (4) inches and the thickness of the wall shall be not less than one-quarter ( $\frac{1}{4}$ ) inch. The ducts shall be furnished with a drive joint and free from burrs or any unevenness that would tend to abrade or otherwise injure the cable during installation. The ducts shall be laid as prescribed in Section 110-9. After the concrete covering has been placed over the ducts and set, they shall be rodded and plugged as specified for vitrified ducts. The rodding mandrel shall be three and three-quarter ( $3\frac{3}{4}$ ) inches in diameter and not less than three (3) feet long.

Inspection.

110-13. All vitrified and fiber ducts shall be subject to inspection both at the place of manufacture and on the work. All rejected ducts shall be promptly removed by the Contractor at his expense.

Measurement and payment, ducts.

110-14. All vitrified and fiber ducts will be measured for payment on the basis of their actual length in duct feet (lineal feet of equivalent single duct), as laid in the work, and payment will be made at the price stipulated in Schedule Item 110, which price shall be in full compensation for the complete furnishing, laying, rodding and plugging of such ducts and all expense in connection therewith or incidental thereto.

Measurement and payment, steel bonding straps.

Steel bonding straps will be measured as provided in Section 70-50, and paid for at the price stipulated in Schedule Item 73.

#### ITEM 112—ASBESTOS MATERIALS.

Composition.

112-1. Asbestos lumber shall be made of fibered asbestos, free from organic matter, impregnated with Portland cement and compressed into homogeneous, sound, dense sheets of uniform thickness throughout and shall have at least one smooth sand finished surface.

112-3. All asbestos lumber furnished under this contract shall possess the following qualities as determined by test: Tests.

(a) When dried in an oven for twelve (12) hours at a temperature of two hundred twenty degrees (220°) F., the one-fourth ( $\frac{1}{4}$ ) inch thick material shall weigh not less than two and four-tenths (2.4) pounds per square foot. Weight.

(b) After being dried in the manner prescribed in the preceding paragraph, the test piece shall be immersed in water at room temperature. The water shall then be raised to the boiling point, after which it shall be allowed to cool for twenty-four (24) hours. The test piece shall then be removed and weighed. The increase in weight after immersion shall not exceed twenty per centum (20%). Absorption.

(c) A test piece twelve (12) inches wide and of sufficient length to get proper bearing on supports separated by a distance of twelve (12) inches, shall, after drying as prescribed in paragraph (a) above, be capable of sustaining without rupture the load indicated in the following table when applied to a cylindrical bar placed on the test piece midway between supports. Breaking strength, dry.

| Thickness,<br>inches | Weight dry<br>lbs. per sq. ft. | Load,<br>lbs. |
|----------------------|--------------------------------|---------------|
| $\frac{1}{4}$        | 2.4                            | 200           |

(d) Test pieces treated as prescribed for absorption shall, when wet, support, without rupture, loads within thirty-three and one-third per centum ( $33\frac{1}{3}\%$ ) of that prescribed in the paragraph next preceding and after drying as prescribed in paragraph (a) above, shall regain full strength shown prior to immersion. Breaking strength, wet.

(e) Test pieces heated with an electric muffler to a temperature of fifteen hundred degrees (1500°) Heat test.

F. shall, when cool, show no signs of disintegration, splitting or cracking other than fine surface hair cracks.

Measurement,  
asbestos  
lumber.

112-4. Measurement for payment of asbestos lumber one-fourth ( $\frac{1}{4}$ ) inch in thickness will be of the area installed, in accordance with the drawings or orders.

Payment,  
asbestos  
lumber.

Payment for asbestos lumber will be at the price stipulated in Schedule Item 112 (a), which price shall be in full compensation for furnishing and placing the lumber complete, and all expense in connection therewith or incidental thereto.

ITEMS 120-122—WATER PIPE AND GAS PIPE CHANGES.

Measurement  
and payment,  
pipe changes.

120-1. Changes of such water, gas or other pipes, except sewer pipes and electric conduits, as are necessary to avoid interference with the Tunnel requiring the shifting, relaying or reconstructing of such pipes with their connections and other appurtenances, to or in positions other than their original positions, will be measured for payment on the basis of the actual length of pipe in the new position, as shown on the drawings or as ordered, and payment will be at the appropriate price stipulated in Schedule Item 120 or 122, which price shall be in full compensation for shifting, relaying or reconstructing such pipes, their connections and all other appurtenances, and all expense in connection therewith or incidental thereto, including laying the pipe, removing and disposing of the old pipe replaced, caulking and re-caulking all joints, placing valves, moving hydrants, for excavation, for placing concrete, for backfilling and pavement restoration, and for furnishing all labor and materials for surface or other connections, and no allowance will be made therefor, excepting that:

New pipe.

(1) New pipe, ordered by the Engineer to take the place of such pipe as, in his opinion, cannot be preserved and used, will be measured for payment on the basis of



the actual amount of new pipe in place, subject to the limitations of Section 91-18 as to excess weights, and paid for at the appropriate price stipulated in Schedule Item 91 or 92, which price shall be in full compensation for furnishing the new pipe and all expense in connection therewith or incidental thereto.

(2) Excavation outside the ordered net lines of excavation for the Tunnel for any such pipe and its appurtenant valve chambers, valves, valve boxes and hydrants in their new required positions, and in excess of excavation otherwise required, will be measured as described in Sections 1-7, 1-11 and 1-13, and paid for at the prices stipulated in Schedule Items 2 or 3. Excavation.

(3) New valve chambers built in their new required positions, in connection with water or other pipe changes, will be measured as described in Sections 27-27, 70-50, 85-15 and 95-1, and paid for at the prices stipulated in Schedule Items 27 (d), 70 (b), 72, 73, 74, 86 (e) or 95 (a). Valve chambers.

(5) Pavement restoration, outside the ordered net lines of excavation for the Tunnel, for any such pipe and its appurtenant valve chambers, valves, valve boxes and hydrants in their new required positions, and in excess of excavation otherwise required, will be measured as described in Sections 164-1 to 164-9, inclusive, and paid for at the price stipulated in Schedule Item 164 or 166. Pavement restoration.

Payment for changing a steam line serving the Erie Railroad Company, if required, will be made as provided in Schedule Item 300. Payment, changing steam line.

#### ITEM 126—ELECTRIC DUCT AND CONDUIT CHANGES.

126-1. Changes of such electric duct and conduits as are necessary in order to avoid physical interference with the Tunnel requiring the shifting, relaying or reconstructing of such ducts and conduits with their connections and other appurtenances to or in positions other Measurement and payment, duct changes.

than their original positions, and including any tile pipe or tile duct laid between manholes as an open vent or connection between such manholes will be measured for payment on the basis of the actual length in duct feet (lineal feet of equivalent single duct) of the ducts or conduits, but not including their service connections or other connections, in the new required positions as ordered, and payment will be at the price stipulated in Schedule Item 126 for conduits, which price shall be in full compensation for shifting, relaying or reconstructing such ducts and conduits, their connections and all other appurtenances, and all expense in connection therewith or incidental thereto, including furnishing and placing new ducts and conduits and other fixtures where necessary, the drawing of cables and providing new cables where necessary, excavation, concreting, back-filling and pavement restoration, for service connections and other appurtenances, and no other allowance will be made therefor excepting that:

## Excavation.

(1) Excavation for any such ducts and conduits and their appurtenant manholes, vaults, service boxes and junction boxes in their new required positions, and in excess of excavation otherwise required, will be measured as described in Sections 1-7, 1-12 and 1-13, and paid for at the prices stipulated in Schedule Items 2 or 3.

Manholes  
and vaults.

(2) New manholes, vaults, service boxes and junction boxes built in their new required positions, in connection with duct and conduit changes, will be measured as provided in Sections 27-27, 70-50, 85-15 and 95-1, and paid for at the prices stipulated in Schedule Items 27 (d), 70 (b), 72, 73, 74, 86 (e) or 95 (a).

Pavement  
restoration.

(3) Pavement restoration for any such ducts and conduits and their appurtenant manholes, vaults, service boxes and junction boxes in their new required positions, and in excess of surface restoration otherwise required, will be measured as described in Sections 164-1 to 164-9, inclusive, and paid for at the price stipulated in Schedule Item 164 or 166.

SPECIFICATIONS—SEWER CHANGES

(4) Where cables are required to be drawn from existing duct lines and re-drawn in new or remodeled duct lines, the Contractor will be paid for drawing such cables and re-drawing them in the new or remodeled duct lines and for the cost of furnishing and installing such new cables as may be required, or ordered, on account of changing these cables to the new or remodeled duct lines, as stipulated under Item 300.

Drawing  
cables.

126-4. Measurement for payment will be allowed beyond or outside the zone of physical interference or beyond the point of deviation from the original line, a distance which, in the opinion of the Engineer, is sufficient to permit proper junction to be made with the portion of the duct line which was not in physical interference.

Limitations of  
measurement  
and payment.

ITEMS 130-134—SEWER CHANGES.

130-1. Changes in sewers, in order to avoid physical interference with the Tunnel, will be made according to the drawings, or as ordered. If it shall be impracticable, in the opinion of the Engineer, owing to the presence of surface or subsurface structures, to construct any sewer, manhole or other sewer appurtenance according to the drawings, the Contractor shall construct such sewer, manhole or other sewer appurtenances in a new location given by the Engineer and according to his directions.

Sewer  
changes.

130-2. Sewer openings that are to be maintained for short periods only will not be required to be decked, unless otherwise directed, but the Contractor shall provide and maintain suitable bridges across such openings at intersecting streets and railroad tracks and opposite abutting property where required to facilitate access to such property.

Sewer open-  
ings to be  
bridged.

130-3. The Contractor shall maintain the flow of all sewers and their connections removed or affected in consequence of his work. Where it is necessary to remove sewers or their connections within the lines of any main excavation for the Tunnel, or any excavation forming a part thereof, the flow of such sewers and connections

Maintenance  
of sewer flow.

shall be maintained, where practicable, in temporary metal pipes of adequate size and with tight joints. All wooden flumes for the temporary maintenance of sewer flow shall be of ample dimensions and shall be kept tight. Temporary house connections shall be made by means of iron pipes with tight joints; wooden troughs for house connection will not be permitted. All offensive matter shall be removed promptly in such manner and with such precautions as the Engineer may direct.

Extent of excavation.

130-4. The excavation of trenches shall be completed for a sufficient distance in advance to permit the proper laying of the sewer and the proper maintenance of sewer flow; and not more than two hundred (200) feet of trench shall be open at any one time in advance of the completed sewer, unless with the permission of the Engineer and then only for such distance as he shall permit.

Foundations.

130-5. Sewer trenches shall be excavated in firm soils to the required depth and outline of the bottom of the sewer or its foundation. Where the soil at such depth does not afford, in the opinion of the Engineer, a sufficiently solid foundation, the trench shall be excavated to such increased depth as he may deem necessary and shall be refilled with such material and in such manner as he may direct to the required level and form. Pile foundations, capped with timber or reinforced concrete, shall be provided under sewers where required by the Engineer.

Testing grades.

130-6. No sewer shall be built until the trench is properly prepared to receive the foundation and until the grades therefor shall have been tested and approved by the Engineer.

Exposed ends protected.

130-7. The exposed ends of sewers shall be fully protected at all times.

Excavation to be dry.

130-8. The excavation shall be kept sufficiently free from water to permit sewer construction to be carried on as nearly as possible in the dry. No water shall be allowed to flow over the invert or foundations or through the sewer until the mortar or concrete is thoroughly set.



130-9. In addition to the requirements, under other Items of these specifications, applicable to brickwork, concrete and other construction features of sewers, their connections and other appurtenances, the following requirements relate specifically to sewer work.

Additional  
construction  
requirements.

130-10. Bricks shall be neatly and truly laid, every second course to line, and the joints shall be carefully struck on the inside. All brickwork, as it progresses, shall be racked back in courses, and must not be toothed except as specially permitted by the Engineer. A limited number of bats, not smaller than half bricks, may be used in manholes and closers and in the outer ring of sewers where more than two rings of brick are required.

Brickwork.

130-11. All inverts or bottom curves shall be formed from profiles or templates accurately made according to the dimensions of the sewer and correctly set according to the grades furnished. The masonry shall be allowed to set for twenty-four (24) hours before the arch is turned. Vitrified brick or granite paving blocks shall be used for the inner ring of the invert where required by the Engineer and must be thoroughly jointed so as to be water-tight along the inner surface of the sewer. The last course of the invert masonry below the springing line shall be laid as headers.

Inverts of  
brick sewers.

130-12. The arches shall be formed on strong centers of correct form, according to the sizes and shapes required, and keyed with stretchers in full joints of mortar. The extrados of the arch shall be plastered with mortar one-half ( $\frac{1}{2}$ ) inch thick. The centers shall not be removed or withdrawn until the work is thoroughly set and until the filling in of the arch is properly put into place to a depth of at least one (1) foot above the crown of the arch. The centers in all cases shall be struck and not drawn, so as not to crack or injure the work. Should any crack or settlement appear in the arch after the centers are removed, so much of the work as the Engineer may require shall be taken down immediately and rebuilt.

Arches and  
centering,  
brick sewers.

Spurs in  
brick  
sewers.

130-13. Cast-iron sewer pipe spurs, equal in every respect to the pipes described elsewhere herein, and of a size required by the Engineer, but not less than six (6) inches interior diameter, with hubs moulded for house connections, and of sufficient length to project at least four (4) inches beyond the exterior of the sewer, shall be built into the walls of brick sewers at such angles as are indicated on the drawings or as the Engineer may direct.

Location  
of spurs.

130-14. Spurs shall be built in wherever house connections exist in the sewers to be reconstructed, but shall not be less than twenty-five (25) feet apart. In the case of the construction of new sanitary sewers where no sewers existed previously, except sewers crossing intersecting streets, spurs shall be built in opposite each house, and where there are no houses they shall be not more than twenty-five (25) feet apart on each side of the sewer or at such frequent intervals as local conditions may require. They shall be set so that their inner ends shall be flush with the inner face of the sewer, at such height in the walls as the Engineer may direct, and each pipe shall be sealed on the outside with an approved earthenware cover set in mortar.

Cast-iron  
pipe sewers.

130-24. Sewers of cast-iron pipe, furnished and placed in the manner described elsewhere in these specifications for water pipes, shall be laid wherever indicated on the drawings or wherever the Engineer may direct.

Connections  
with new  
work.

130-27. All existing sewers, culverts, drains and house connections intercepted by the proposed sewers, culverts or receiving basins, shall be connected with the new work by proper curves and grades and in such manner as the Engineer shall direct; and all sewers, drains, basins and culverts rendered unnecessary or becoming disused by the work hereunder shall be filled in solidly with earth in the manner directed. Provision shall also be made for the connection of future sewers or basins by constructing brick spurs or inserting pipe at the points indicated on the drawings and at such other points as the Engineer may

direct. These connections shall be closed with approved bulkheads.

Provision shall be made in shifting the steel pipe sewers in Twelfth Street, and Twelfth Street produced and in Provost Street, to meet any excessive or storm discharge that the sewer might have to carry. The pipe shall be properly supported at all times so as to prevent distortion or injury. In its new position the pipe shall be provided with adequate support, not only to prevent settlement, but to prevent distortion in backfilling. The relocated pipe shall be as substantial and serviceable as it was in its former position.

Steel pipe  
sewers.

130-28. All work shall be carefully protected from injury in every way. No wheeling or walking upon it will be allowed and any portion injured must be relaid by the Contractor; no walking or working over the pipes after they are laid, except as may be necessary in tamping the earth and refilling, will be allowed until there are at least two and one-half ( $2\frac{1}{2}$ ) feet of earth over them.

Fresh work  
to be pro-  
tected.

130-29. The interior of pipe sewers shall be carefully freed from all dirt, cement and other material as the work progresses and shall be left clean and smooth.

Cleaning  
pipe sewers.

The ends of pipe sewers temporarily exposed shall, in all cases, be protected with a bulkhead or other stopper carefully fitted to the pipe, to prevent earth or other substances from washing in, and in no case shall brick or stone be used for that purpose.

Temporary  
ends of  
pipes to be  
protected.

130-30. The masonry of manholes shall be carried up so that the top of the iron head when set shall be at the level of the established grade of the street at that point or to such height as the Engineer may direct, and from templates correctly made and set at top and bottom, between which templates not less than eight lines shall be drawn. All joints shall be neatly struck and pointed on the inside. Each manhole shall be plastered thoroughly on the outside with cement mortar one (1) inch in thickness, mixed in the proportion of one (1) part of cement to two (2) parts of sand.

Manholes.

Foundation  
for manholes.

130-31. The foundations for manholes shall be of concrete or masonry, as indicated on the drawings, and shall extend not less than twelve (12) inches below the invert elevation of the sewer, except as otherwise indicated on the drawings. When foundation additional to that indicated on the drawings is required, it shall be built as directed by the Engineer.

Pipes built  
into man-  
holes.

130-32. Sewer pipes shall be built into manholes and trimmed, when required, so as to be flush with the inner face of the manhole and an arch shall be turned over the pipe.

Inverts of  
manholes.

130-33. The invert of manholes shall be built of vitrified brick, stoneware block, granite blocks or concrete, as indicated on the drawings.

Steps in  
manholes.

130-34. Standard steps of galvanized wrought iron and of the size, length and shape required, shall be built into the interior sides of all manholes at a distance of not more than fifteen (15) inches apart vertically and they shall be so arranged that the lowest step shall be not more than two (2) feet above the bench at the bottom of the manhole nor more than two (2) feet above the invert of the sewer where there is no bench. Each manhole head shall be cast with a wrought-iron step on the inside, if directed by the Engineer.

Manhole  
heads and  
covers.

130-35. A cast-iron manhole head and cover of the quality specified for cast iron and, except in special cases, of the pattern adopted by the Sewer Department of Jersey City, and in dimensions, weight and all other respects satisfactory to the Engineer, shall be fitted on a bed of mortar to each manhole, as required.

Perforated  
covers.

130-36. Covers to be used on manholes in roadways shall be perforated.

Weights of  
heads and  
covers.

130-37. Each manhole head and cover shall have its weight distinctly marked upon it with oil paint.

Manholes  
completed as  
work pro-  
gresses.

130-41. Manholes shall in all cases be fully and completely built and fitted with their covers as the work progresses, and the sewers shall not be laid beyond or in advance of any uncompleted manhole.



- 130-42. Receiving basins shall be built as directed by the Engineer and according to the drawings. Basins shall be thoroughly plastered, both inside and outside, with cement mortar. Receiving basins.
- 130-43. The foundations for receiving basins shall be of concrete or masonry, as indicated on the drawings and shall extend not less than twelve (12) inches below the finished floor of the basin, except as otherwise indicated on the drawings; when additional foundation is required, it shall be built as directed by the Engineer. Foundations for basins.
- 130-44. Where head stone and gutter stone are required for receiving basins, they shall be of sound, durable granite of the dimensions indicated on the drawings, hammer dressed to an even surface and cut to the satisfaction of the Engineer. Cast-iron basin heads and gutter pieces of the design indicated on the drawings shall be set instead of the above when required. Head and gutter stones.
- 130-45. A cast-iron basin cover of the pattern adopted by the Sewer Department of Jersey City and approved by the Engineer, shall be fitted to the opening in the head stone. Basin covers.
- 130-46. A grate bar made according to the drawings shall be fastened solidly into the head stone in an approved manner where required. Grate bars.
- 130-47. Cast-iron traps of the pattern adopted by the Sewer Department of Jersey City and approved by the Engineer, free from imperfections and coated with coal-tar pitch, shall be furnished and built into receiving basins as directed by the Engineer. Basin traps.
- 130-48. The joints of traps shall be tightly fitted with oakum gaskets and with cement mortar if so desired. Joints of traps.
- 130-49. Galvanized iron steps of the same design required for manholes shall be built into the walls of receiving basins. Steps in basins.
- 130-50. The culvert pipe for connections of receiving basins with sewers shall be twelve (12) inch vitrified pipe Basin culverts.

unless otherwise indicated on the drawings, and of the kind and quality hereinafter described, and shall be laid, in all cases, in a concrete cradle of the form and dimensions required for pipe sewers, in accordance with the directions of the Engineer. In case it becomes necessary to connect any basin already built with the work to be constructed, so much of such culverts as in the opinion of the Engineer may be necessary shall be taken up and rebuilt or relaid, as the case may be, in the manner described above and reconnected in a straight line from the basin to the sewer.

Waterproof-  
ing.

130-52. Whenever, in the opinion of the Engineer, it is necessary to waterproof a sewer, chamber or receiving basin or their appurtenances, such waterproofing shall be done as indicated on the drawings or as directed by the Engineer in accordance with the provisions of Sections 60-1 to 60-14.

Payment,  
protective  
paints.

If bituminous or other protective paints are required, payment therefor will be made as provided under Schedule Item 300.

Tests, steel  
pipe sewer.

The steel pipe sewer shall be riveted and caulked to obtain a water-tight structure. A test may be required for all new or re-laid sections of the steel pipe sewer under a water pressure of thirty (30) pounds per square inch. If leaks should develop, they are to be caulked or otherwise stopped in an approved manner to withstand the above mentioned pressure. Tests, if required, are to be made before the coating is applied. Payment for such tests will be made as provided under Schedule Item 300.

Sewer work  
to be kept  
clean.

130-54. During the progress of the work, and until the entire completion and final acceptance thereof, the sewers, drains, basins, culverts and connections shall be kept thoroughly clean throughout, and left clean, and the drainage of any old sewer that may be taken up or intercepted shall be provided for and taken care of by the Contractor at his own expense.

Vitrified pipe  
sewers.

130-55. Vitrified pipe sewers shall be built of vitrified, salt-glazed stoneware pipe, with extra deep and wide sockets and corrugated spigot ends. The pipe shall be

of the best quality, thoroughly and perfectly burnt, without warps, cracks or imperfections, well and smoothly glazed over the entire inner and outer surfaces and perfect in shape. The pipe shall be subject, as required by the Engineer, to all tests ordered in conformity with any requirements of the Sewer Department of Jersey City.

130-56. The sizes of the pipes shall be designated by their interior diameters. Each pipe shall be a true cylinder, of even thickness throughout, and shall conform to the following scheduled dimensions:

Sizes to be designated by interior diameter.

DOUBLE STRENGTH VITRIFIED PIPE; EXTRA DEEP AND WIDE SOCKETS.

| Diameter | Thickness of shell | Depth of socket | Length of plain straight pipe | Weight of pipe per ft. | Annular space |
|----------|--------------------|-----------------|-------------------------------|------------------------|---------------|
| 6"       | 5/8"               | 2 1/2"          | 2'                            | 16 lbs.                | 5/8"          |
| 8"       | 3/4"               | 2 3/4"          | 3'                            | 25 "                   | 5/8"          |
| 10"      | 7/8"               | 2 3/4"          | 3'                            | 37 "                   | 5/8"          |
| 12"      | 1"                 | 3"              | 3'                            | 45 "                   | 5/8"          |
| 15"      | 1 1/4"             | 3"              | 3'                            | 75 "                   | 5/8"          |
| 18"      | 1 1/2"             | 3 1/4"          | 3'                            | 118 "                  | 5/8"          |
| 20"      | 1-2/3"             | 3 1/2"          | 3'                            | 148 "                  | 5/8"          |
| 22"      | 1-5/6"             | 3 3/4"          | 3'                            | 157 "                  | 5/8"          |
| 24"      | 2"                 | 4"              | 3'                            | 190 "                  | 5/8"          |

130-57. All "special" vitrified pipe shall conform to the dimensions given for plain, straight pipe.

Special vitrified pipe.

130-58. Pipes having spurs not less than six (6) inches in diameter with hubs moulded thereon for house connections shall be furnished and laid at such points as indicated on the drawings or as directed by the Engineer, and when not immediately used, they shall be sealed on the outside with approved vitrified earthenware covers set in mortar.

Spurs.

Laying  
vitrified pipe.

130-60. All vitrified pipe shall be laid in concrete cradles of the required form and dimensions. The minimum thickness of concrete under the outside of the shell, or barrel, shall be six (6) inches. The first layer of concrete shall be for the full width of the cradle, and shall be deposited to the height of the outside bottom of the bell of the pipe; the pipe shall be laid upon this concrete true to line and grade and after the joints are caulked as specified in Section 130-61 the remainder of the concrete shall be deposited and carefully tamped in such a manner as to avoid disturbing the sewer. The ends of the pipes shall abut against each other in such manner that there shall be no shoulder or unevenness of any kind along the bottom half of the sewer on the inside.

Caulking  
joints.

130-61. After pipes are fitted, a narrow gasket of oakum or hemp dipped in cement grout shall be properly caulked into each joint, after which cement mortar mixed in the proportion of one (1) part of cement to two (2) parts of sand shall be thoroughly caulked into the annular space between the outside of the pipe and the inside of the bell to bring the inverts of the abutting pipes flush and even with the established flow line. The outside of each joint shall be carefully wiped to a smooth bevel and all mortar that may be left on the inside of the pipe shall be thoroughly removed and the inside of the pipe left clean and smooth throughout.

The ends of pipes which enter masonry shall be neatly cut to fit the face of the masonry. When directed, such cutting shall be done before the pipes are built in.

Measurement  
and payment  
for brick  
sewers.

130-64. Measurement for payment for brick sewers will be of the actual net volumes of brick masonry in the barrel of such sewers and in manholes and receiving basins appurtenant thereto as built to the lines shown on the drawings or as ordered by the Engineer; and payment therefor will be at the prices stipulated in Schedule Item 34 for brick masonry, which price shall be in full compensation for providing the sewer complete with all



foundations, manholes, receiving basins, connections and other appurtenances, and all expense in connection therewith or incidental thereto, except as provided in Section 130-65.

130-65. In addition to the payment for sewer work provided in the preceding Section, payment for new sewer will be made as stipulated in Schedule Items:

Additional  
payment,  
other items.

2 or 3. For excavation for sewers, basin culverts, manholes and receiving basins, but not including their connections or any other sewer appurtenances;

27 (d), 53 or 59. For foundations required to support sewers, manholes, receiving basins or other sewer appurtenances;

70 (b), 72, 73, 74, 75 (g), 86 (e) or 95(a). For steel beams, rods or wire mesh, miscellaneous fixtures or castings required to be placed as a part of sewers or their appurtenances; or

164 or 166. For street pavement restored within the ordered net lines of excavation for sewers, basin culverts, manholes and receiving basins, but not including their connections or any other sewer appurtenances.

Payment for furnishing cut stone foundations or cover slabs for basin culverts or manholes, if required, will be made as provided in Schedule Item 300.

130-66. Measurement for payment for laying cast-iron pipe sewers will be of the length laid without deduction for manholes and payment therefor will be at the price stipulated in Schedule Item 133, which price shall be in full compensation for laying the pipe, removing and disposing of old pipe not used, caulking joints, for excavation, concrete, backfilling and pavement restoration and all expense in connection therewith or incidental thereto, including the construction or reconstruction of all connections or other appurtenances of such sewer; except

Payment for  
cast-iron  
pipe sewers.

that additional payment will be made as provided in Section 130-65. Payment for new pipe furnished as required will be as provided under Items 91 or 92.

Measurement  
and payment,  
vitrified pipe  
sewers.

130-68. Measurement for payment for furnishing and laying vitrified pipe sewers will be of the actual length placed in accordance with the drawings or orders and payment therefor will be at the prices stipulated in Schedule Item 130, which prices shall be in full compensation for providing the sewer complete with all connections and other appurtenances, and all expense in connection therewith or incidental thereto, except that additional payment will be made as provided in Section 130-65.

Measurement,  
changing  
steel pipe  
sewers.

130-69. Measurement for payment for changing steel pipe sewers will be of the actual length of such sewers in their new positions in accordance with the drawings or orders, such measurement being taken along the center line of the relocated sewer and limited by the points on the center line of the old sewer where such relocation begins and ends.

Payment,  
changing  
steel pipe  
sewers.

Payment for changing steel pipe sewers will be at the price stipulated in Schedule Item 134, which price shall be in full compensation for removing and disposing of the pipe replaced, excavation, concrete, backfilling, pavement restoration and for laying, supporting, shifting, caulking to make water-tight, the construction or reconstruction of all necessary connections and other appurtenances of such sewer, and for all expense in connection therewith or incidental thereto, except that additional payment will be made as provided in Section 130-65.

Measurement  
and payment,  
new steel  
sewer pipe.

Measurement for payment for furnishing new steel pipe required for the relocated steel pipe sewers will be of the actual weight of such new pipe placed in the work; and payment will be made at the price stipulated under Schedule Item 75 (g) which price shall be in full compensation for furnishing the pipe and all expenses in connection therewith or incidental thereto.

Certain air valves and other appurtenances now in use on the sewers to be relocated or reconstructed may not be required in their present locations and these air valves or other appurtenances are to be carefully preserved by the Contractor for use in such other locations as indicated on the drawings or as directed by the Engineer.

Air valves  
and other  
appurte-  
nances.

Payment for the resetting of such air valves or other appurtenances is deemed to be included in the unit prices stipulated in the Schedule for changing pipe.

Payment.

#### ITEM 155—FENCING.

155-1. Upon the completion of all other work of this contract and during the time of cleaning up the Works the Contractor shall build a fence around such openings and in such places as the Engineer may direct. The fence is to be a tight board fence eight (8) feet high with 6" x 6" posts spaced eight (8) feet on centers, sunk four (4) feet into the ground. The lagging is to be one (1) inch tongued and grooved boards planed on both sides. Such gates as may be required, with suitable fastenings, shall be furnished. The fence shall be painted on both sides with two (2) coats of approved paint. This fence, including gates, will be estimated for payment according to the number of lineal feet of fence actually built and payment therefor will be made at the price stipulated in Schedule Item 155, which price shall be in full compensation for furnishing all material and labor, erecting the fence complete and painting. This Item does not in any way apply to the Contractor's fence around his plant, provided for under Section 22.

Fences.

#### ITEMS 164-166—RESTORATION OF PAVEMENT.

164-1. Restoration of pavement will include the restoration of all areas disturbed by the operations of the Contractor whether or not within the payment lines of exca-

Surface  
restoration.

vation necessitated by the construction of the Tunnel, sewers or other structures to be built under this contract.

Philippine Vegetable Oil Co.'s driveway and track.

Included in the surfaces to be restored is the concrete paved railroad track and driveway serving the buildings of the Philippine Vegetable Oil Company.

Temporary pavement.

As soon as the backfilling of any excavation made from the surface within a street or driveway shall be completed, a temporary pavement shall be laid and maintained in a manner satisfactory to the Engineer, for a sufficient period of time (at least four months) to insure against further settlement.

Restoration of permanent pavement.

164-2. After such time as the earth shall, in the opinion of the Engineer, have become sufficiently settled, the Contractor shall restore the pavement or other surface to a condition similar to and equally as good as that which existed previous to the commencement of work under this contract.

All surfaces disturbed to be restored.

164-3. All other pavements and surfaces that may have become damaged, directly or indirectly, as a result of the Contractor's operations, shall be restored by the Contractor at his own expense, as soon as practicable after such damage is done, to a condition similar to and equally as good as that which existed before such damage occurred.

Measurement and payment, restoration, general.

164-6. Measurement and payment for restoring pavement will be made only where measurement and payment are provided for excavations required, as specified in Sections 1-7, 1-8, 1-10, 1-11, 1-12 and 1-13. The payment lines for street surface restored will be the same as those for excavation where such payment lines for excavation meet the surface or to the lines shown on the drawings where other restoration is specifically ordered. The area for payment will be the total plan area, within such payment lines, which the Contractor is required to restore. No allowance will be made for the restoration of any pavement more than once within the same space.



164-7. Measurement for payment for pavement restored between curb lines will be of the areas within payment lines of all roadway pavements and other surfaces, which the Contractor is required to restore, and payment will be made at the price stipulated in Schedule Item 164, which price shall be in full compensation for completely restoring all surfaces between such curb lines whether within or without the payment lines and all expense in connection therewith or incidental thereto, including the placing and maintaining of the temporary pavement.

Measurement and payment, street surface between curbs.

Measurement for payment for restoration of the concreted area serving the Philippine Vegetable Oil Company will be of the actual volume of concrete placed in accordance with the drawings, or as directed by the Engineer; and payment will be made at the price stipulated in Schedule Item 27(d). The work of restoring the railroad track will be as provided in Section 20-2.

Measurement and payment, restoration of concrete.

Measurement for payment for curbing restored will be of the length within the limits, as set forth in Section 164-6, which the Contractor is required to restore and payment will be made at the price stipulated in Schedule Item 166, which price shall be in full compensation for completely restoring the curb to the required grade and all expense in connection therewith or incidental thereto, including the temporary maintenance of the curb, in connection with the temporary pavement, the placing of special curbing at catch basins and other openings in the street, and the setting and placing of the curbing.

Measurement and payment for curbing.

164-9. Nothing contained in these specifications shall be understood or construed as prohibiting the Contractor from making any arrangement with the City of Jersey City to lay a better or other form of street pavement in the roadway between curb lines. If the Contractor shall make any such arrangement, he shall file with the

Other form of pavement may be laid.

Commissions a copy of his contract with such municipal officer or with such property owner, duly acknowledged in writing by both parties.

In case the municipal officer in charge of street paving or any property owner desires to lay a pavement in the roadway between curb lines, or a sidewalk or other surface covering within curb lines, affected by this contract, different from the one removed, and shall notify the Commissions in writing that he has failed to make satisfactory arrangements for such work with the Contractor, then the Commissions, in their discretion, may direct the Contractor to finish and dress off the filling over his work to such grade and within such area as the Commissions may determine and may further direct him to remove from such area all material of whatever nature not required to be relaid and to permit another contractor to lay such roadway pavement, sidewalk or other surface covering; in which case the liability of the Contractor under this contract shall cease, as far as the restoration of such area is concerned, whenever the Engineer shall report to the Commissions that the directions of the Commissions have been complied with, exactly the same as if the Contractor had fully completed the restoration within such area as hereinbefore provided. Such area will not be included in the measurements for payment for surface restoration. Payment for finishing and dressing off the filling, and removing all materials not required to be relaid within such area is included in the prices stipulated in the Schedule for excavation.

## APPENDIX TO SPECIFICATIONS

Sections of Contract between the Commissions and the Erie Railroad Company, dated December 7, 1921. Complete copies of this contract with the maps referred to herein are on file in the office of the Commissions and are available to the bidder for his examination.

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As to parcels Nos. One (1), Two (2), Three (3), Four (4) and Five (5), the Railroad Company reserves the ownership of all railroad tracks or other structures of whatsoever nature, except as herein otherwise provided, on or above the surface of the said parcels and shall remove, relocate and construct such tracks and structures within thirty (30) days after notice to it by the Chief Engineer of the Commissions. The Commissions shall bear the expense of removing, relocating and constructing such tracks in a manner to be approved by the Chief Engineers of the parties hereto, except the two southerly tracks on parcel No. One (1) west of Barnum Street (so-called) produced with two tracks are to be permanently discontinued. The Railroad Company shall have the right to maintain a track on the said parcel No. One (1) south of the parapet wall of the Tunnel structure and east of the present blacksmith shop over a width of not less than three and one-half ( $3\frac{1}{2}$ ) feet of the said parcel. It shall also have the right to use the surface of all that portion of the said parcel south of the said parapet wall, in a manner not detrimental, in the opinion of the Chief Engineer of the Commissions, to the Tunnel structure. The Commissions shall at their expense move the northerly track crossing parcel No. One (1), shown on Drawing No. One (1), File N-146, dated July 28th, 1921, to the north and relocate and construct the said track in Twelfth Street or Twelfth Street produced in the location shown on the said drawing and in a manner to be approved by the

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For drawings referred to in this Appendix see Supplementary Drawings.

Chief Engineer of the Railroad Company. References in this paragraph and in the said drawing (and in the petition, if any, for a municipal ordinance to authorize or permit the said act of relocation as provided in this paragraph) to the northerly track crossing parcel No. One (1) are solely for the purpose of making necessary provisions for the act of relocation of the said track and shall not be construed as having any other effect.

As to parcels Nos. Two (2), Three (3) and Four (4), and as to so much of parcel No. One (1), as is reasonably necessary for access by the Commissions to parcel No. Twenty-one (21), the Railroad Company shall, within thirty (30) days after notice to it by the Chief Engineer of the Commissions, permit the Commissions, their agents, contractors and employees to enter in and upon the said premises and assume possession thereof for the purpose of constructing the said Tunnel and the said rights of entry and possession shall not be contingent upon or limited by the obligation of the Railroad Company as to the time of delivery of the deeds for the said parcels as provided in this Article.

The Commissions shall, at their expense, and where necessary to avoid interference with the tunnel, move, relocate or reconstruct outside of the limits of the said parcels, and in a manner approved by the said Chief Engineers, all water, sewer, gas, duct and power or other lines and so connect them with existing lines that they will take the place of the said existing water, sewer, gas, duct and power or other lines now lying within the described parcels. They shall prosecute the said work of moving, relocating and reconstructing with diligence and without unnecessary interruption of the use thereof or unnecessary interference with the operations of the Railroad Company. In so doing, the Commissions shall have the right to move, relocate or reconstruct the said pipes or ducts or any part of them so far as may be necessary outside of the limits of the said parcels, provided that



they promptly restore the premises and surface in a manner approved by the Chief Engineer of the Railroad Company. They shall also have the right to use all or parts of the said pipes or ducts or any materials therein as the Chief Engineer of the Commissions may deem desirable.

So far as the Railroad Company has the power to do so, it shall give and it shall assist the Commissions in securing whatever consents or authorizations may be necessary to make such removals, relocations and reconstructions.

The Railroad Company hereby grants to the Commissions the right to construct and maintain three (3) underground discharge pipes, two (2) of them from the land shafts and one (1) of them from the ventilation equipment building, all to terminate at the present bulkhead. The exact location and depth of the said discharge pipes below the surface of the ground, the materials of which they are to be constructed and the method of protecting them, if protection is necessary, are to be subject to the approval of the Chief Engineer of the Railroad Company. If, in the opinion of the Chief Engineer of the Railroad Company, it ever becomes necessary to relocate, renew, repair or extend the said discharge pipes, the Commissions shall make such relocation, renewal, repair or extension at their expense.

The Commissions shall procure or cause to be procured adequate insurance or other indemnification, satisfactory to the Railroad Company, to protect the Railroad Company from all claims, demands and causes of action for personal injury or property damage arising from the prosecution of the work, except where such personal injury or property damage results from the negligence of the Railroad Company, its agents or employees.

The Commissions, if necessary, during construction, shall support, underpin or reconstruct the shop buildings or other structures of the Railroad Company adjacent to

the parcels referred to in this Article as Nos. 1 to 5, inclusive, in a manner approved by the said Chief Engineers.

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As to all of the foregoing parcels included in this Article (Parcel 6, 10, 11, 12, 13, 14, 15 and 16, 29, 7, 8, 9, 9a) the Commissions shall have the right to provide supports in the earth beneath the spaces in which the said easements are granted for the purpose of supporting the structures which may be or are to be erected within the said spaces; and the Railroad Company reserves the ownership of all railroad tracks or other structures of whatsoever nature, except as herein provided to the contrary, on or above the surface of the said parcels.

The Commissions shall, at their expense, where necessary to avoid interference with the construction of the Tunnel, move, relocate or reconstruct outside the limits of the said parcels, and in a manner approved by the said Chief Engineers, all water, sewer, gas, duct and power or other lines and connect them with existing lines so that they will take the place of the said existing water, sewer, gas, duct and power or other lines now lying within the described parcels. They shall prosecute the said work of moving, relocating and reconstructing with diligence and without unnecessary interruption of the use thereof or unnecessary interference with the operations of the Railroad Company. In so doing, the Commissions shall have the right to move, relocate or reconstruct the said pipes or ducts or any part of them, so far as may be necessary, outside of the limits of the said parcels, provided they promptly restore the premises and surface in a manner approved by the Chief Engineer of the Railroad Company. They shall also have the right to use all or parts of the said pipes or ducts or any materials therein belonging to the Railroad Company, as the Chief Engineer of the Commissions may deem desirable. So far as the Rail-

road Company has the power to do so, it shall give and it shall assist the Commissions in securing whatever consents or authorizations may be necessary to make such removals, relocations and reconstruction.

The Commissions shall procure, or cause to be procured, adequate insurance or other indemnification, satisfactory to the Railroad Company, to protect the Railroad Company from all claims, demands and causes of action for personal injury or property damage arising from the prosecution of the work, except where such personal injury or property damage results from the negligence of the Railroad Company, its agents or employees.

The Commissions, if necessary during construction, shall support, underpin or reconstruct any buildings or other structures of the Railroad Company over the said parcels referred to in this Article, in a manner approved by the said Chief Engineers, and the Commissions shall, thereafter, support the surface of the ground over any underground easements acquired or used by them hereunder in such manner as to permit the free use thereof for railroad purposes.

As to parcel No. Six (6), except about one hundred seven (107) feet of the westerly end thereof, and as to all of parcels Nos. Ten (10), Twelve (12), Fourteen (14), Fifteen (15) and Sixteen (16), the Commissions shall build their structures in excavation made in tunnel beneath the surface of the ground and without material disturbance thereof or of the structures thereon and adjacent thereto. If their construction, in the opinion of the Chief Engineer of the Railroad Company, makes necessary any work of resurfacing, repairing, restoring or reconstructing the tracks or other structures of the Railroad Company on the surface of the ground or above or adjacent to the easements referred to in this Article, the Railroad Company may do such resurfacing, repairing, restoring or reconstructing at the expense of the Commissions, as provided in Article 12 hereof.

As to the westerly portion of parcel No. Six (6) about one hundred seven (107) feet in length, and as to all of parcels Nos. Seven (7), Eight (8), Nine (9), Nine-a (9-a), Eleven (11), Thirteen (13) and Twenty-nine (29), the Commissions may construct their structures by an open cut method, or in tunnel, as they elect. In carrying on the work by an open cut method, the Commissions shall support substantially in its present position the icing track of the Railroad Company over the westerly portion of parcel No. Six (6) and certain of the Railroad Company's tracks, substantially as shown on drawing No. One (1), file N-146, over parcels Nos. Thirteen (13) and Twenty-nine (29). Such necessary support is to be provided by the Railroad Company at the expense of the Commissions in accordance with the plans approved by the said Chief Engineers.

The Commissions shall bear the expense of the necessary work to be done by the Railroad Company in permanently raising the grade of so much of the yard as is shown on plan entitled:

ERIE RAILROAD COMPANY

TERMINAL DIVISION

Preliminary Track Arrangement During Construction  
of Vehicular Tunnel and Limits of Permanent  
Change of Yard Elevation in North Side Yard,  
Jersey City, N. J.

Scale 1" = 50'

July 28, 1921.

Office of Chief Engineer.

Drawing No. 1. Revised Nov. 25, 1921. File N-146. attached hereto and made a part hereof. For this purpose, the Railroad Company shall use so much of the excavated material from the tunnel or tunnels as the Commissions may furnish and as may be necessary and suitable for the purpose.



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The Railroad Company reserves the right to build at any time after the construction of the Tunnel, bulkhead sheds, warehouse or store house building or buildings over and above parcels Nos. Nine (9) and Nine-a (9-a), and over and above its land surrounding the said parcels, except as it may be herein limited by permanent overhead easements granted to the Commissions, or otherwise specifically provided to the contrary. The Commissions shall so construct and maintain their tunnel structures as at all times to support the column footings of such building or buildings in substantially the positions or within the limits shown upon drawing No. Eighteen (18), file No. Fourteen (14).\*

The said tunnel structures shall be of sufficient strength to carry the loads indicated upon the said drawing. In connection with the construction of all foundations for the said buildings including those shown upon the said drawings, and as between the parties hereto, the Railroad Company shall not be liable for damages to the property of the Commissions or for injury to persons upon their property or in their tunnels, resulting from the construction of the foundations of the said buildings or the imposition of the loads therefrom, excepting such damage or injury as may result from the negligence of the Railroad Company, its agents or employees. The work of constructing such foundations shall be done in accordance with plans, specifications and methods approved by the said Chief Engineers, and the Commissions shall keep on the work at all times during the progress thereof one or more engineers or inspectors who shall indicate to the representatives of the Railroad Company the exact location of the tunnels, shafts, ventilating ducts and appurtenances, and such engineers or inspectors shall have the

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\* Under supplementary agreement drawing No. Thirty-eight (38), file No. Fourteen (14), has superseded drawing No. Eighteen (18), file No. Fourteen (14).

right, and it shall be their duty, to stop immediately the doing of any work which is not in accordance with the plans, specifications and methods previously approved by the said Chief Engineers. In the event of disagreement between the inspectors and the men employed by the Railroad Company the matter shall be referred to the said Chief Engineers, who shall direct as to how the work shall proceed.

All permanent underground easements for the construction and maintenance of duct lines include the right to construct and maintain, without further payment by the Commissions to the Railroad Company, manholes extending to the surface of the ground, which said manholes shall be located, in the first instance, in such a manner as not to interfere unreasonably with the proper use of the surface of the ground by the Railroad Company, and in accordance with plans to be approved by the said Chief Engineers, and if the Railroad Company shall desire at any time to move its tracks or structures or change the elevation thereof in such a manner as to require the moving, alteration or reconstruction of the said manholes, such moving, alteration or reconstruction shall be done by the Commissions at their expense.

The descriptions of the easements required for the tunnels, shafts and appurtenances, and all easements adjacent or related thereto, are based upon the construction of the tunnels, shafts and appurtenances to exact line and grade.

If there are slight and immaterial variations in the final location of such tunnel structures and if the final locations of the said tunnels, shafts and appurtenances are found to be substantially, but not entirely, within the boundaries of the easements provided for that purpose, the variation shall be considered a substantial compliance with this contract.

The conveyances of the lands and easements provided

for in Articles 2 and 3 shall be made subject to the rights heretofore given to the Hudson and Manhattan Railroad Company by the Erie Railroad Company and The Long Dock Company by agreement dated June 28, 1907, and recorded in the office of the Register of Deeds of Hudson County in Book No. 1020 at page 610 on November 24, 1908, and the Railroad Company agrees to secure a release from the Hudson and Manhattan Railroad Company of such rights so far as they interfere with the construction of the said tunnel and its appurtenances as contemplated by this agreement, and to transfer the same to the Commissions by bargain and sale deed with covenant of quiet and peaceable possession.

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The periods of occupancy of the said several parcels shall commence on the dates when actual possession is given to the Commissions as hereinafter provided, and shall continue with respect to each of the said several parcels as follows:

|                  |   |
|------------------|---|
| Parcel No. 21    | 3 years 8 months  |
| " " 22           | 3 " 6 "   |
| " Nos. 26 and 31 | 10 " and 2 weeks  |
| " " 23 and 24    | 1 year and 2 months in addition to the ten months and 2 weeks period provided for parcels Nos. 26 and 31. |
| * " " 27         | 6 months and 1 week.  |
| " " 28           | 2 years and 2 weeks beginning with the period provided for parcels Nos. 23 and 24.                        |
| " " 25 and 30    | 1 year.   |

The occupancy of the said several parcels shall be subject to the conditions and covenants herein recited, and

\* The Commissions have subsequently arranged with the Erie R. R. for the occupancy of parcel No. 27 for a period of 10 months. For periods during which these parcels are available to the Contractor refer to Contract Drawing No. 35.

subject to all liens to which the title or possession of the parties of the second part in the said parcels is subject.

The Commissions hereby assume all risks of loss, damage or injury by fire, accident, collision or otherwise to persons or property on or about the said leased premises and all risk of loss of fire to property of the said Commissions or in which they may be interested, arising out of the condition or location of the said premises or the operation, maintenance or existence of the railroad or any of its appurtenances operated by the Railroad Company, its successors or assigns, and agrees to procure or cause to be procured adequate insurance or other indemnification, satisfactory to the Railroad Company, to protect the Railroad Company from all claims, demands and causes of action for personal injury or property damage arising therefrom; except such damage to property or injury to persons as may result from the negligence of the Railroad Company, its agents or employees.

The Railroad Company shall, within thirty (30) days after notice to it by the Chief Engineer of the Commissions, remove the buildings from parcels Nos. Twenty-one (21) and Thirty-one (31) to be used by the Commissions for providing access to their work on other parcels and from so much of the westerly portion of parcel No. Twenty-two (22) as lies west of the present bulkhead. It shall, within thirty (30) days after notice to it by the Chief Engineer of the Commissions, remove at the expense of the Commissions all tracks, structures, equipment or other property, except as herein otherwise provided, from parcels Nos. Twenty-three (23), Twenty-four (24), Twenty-six (26) and Twenty-seven (27) that it may have thereon and shall permit access thereto as herein provided to allow excavation and the construction of the said tunnel or tunnels and other appurtenances. The trestle or bridge necessary to support the track leading across parcels Nos. Twenty-six (26) and Twenty-seven (27) to the south side of pier No. Nine (9) is to be pro-



vided, maintained and removed by the Railroad Company at the expense of the Commissions as indicated on drawing No. One (1), File N-146.

The Railroad Company shall, within thirty (30) days after notice to it by the Chief Engineer of the Commissions so to do, remove from the northerly eighteen (18) feet of pier No. Nine (9), parcel No. Twenty-two (22), all freight, movable or personal property and allow the Commissions to construct on the northerly eighteen (18) feet of the said pier such trestle or runway as, in the opinion of the Chief Engineer of the Commissions, may be necessary for the purpose of the Commissions. The Commissions shall have the right, at any time during the period of the easement pertaining thereto, to replace, reconstruct or strengthen the northerly side of pier No. Nine (9) in such manner as is deemed necessary by the Chief Engineer of the Commissions.

The Railroad Company shall, within thirty (30) days after notice to it by the Chief Engineer of the Commissions so to do, rearrange and support by trestle or otherwise, in a manner approved by the said Chief Engineers, the essential tracks to be maintained over parcel No. Twenty-five (25) in accordance with drawing No. One (1), File N-146, dated July 28, 1921, hereto attached, and remove from the said parcel all other tracks and structures or other property of whatsoever nature that it may have thereon and the Railroad Company shall permit access thereto, as herein provided, to allow excavation and the construction by an open cut method of a portion of the tunnel or tunnels and their appurtenances.

The Commissions may erect and maintain such supports as may reasonably be necessary to carry the platforms, runways or tracks of the Commissions located within the limits of the temporary overhead or aerial easement herein granted, designated as parcel No. Twenty-eight (28). Such supports shall be placed in such

position and in such manner as to provide track clearances acceptable to the Chief Engineer of the Railroad Company for such tracks as may be from time to time in use.

The Commissions shall have the right to lay and maintain over, on or under the surface of the parcels with respect to which temporary easements have been acquired herein, such temporary pipes and ducts as may be found necessary for such tunnel construction, provided they be so constructed and maintained as to provide track clearances, acceptable to the Chief Engineer of the Railroad Company, for such tracks as may be from time to time in use and provided they do not interfere with the use of the said parcels by the Railroad Company during such periods of time as the said parcels may not be in the possession of the Commissions. The said pipes and ducts shall be removed and the parcels restored to their former condition at the expense of the Commissions prior to the opening of the Tunnel for public use. The Commissions shall procure or cause to be procured adequate insurance or other indemnification, satisfactory to the Railroad Company, to protect the Railroad Company from all claims, demands or causes of action for personal injury or property damage arising from or connected with the laying, maintenance, existence, use or removal of the said pipes and ducts.

All work of rearranging, relocating, removing, maintaining and restoring tracks, trestles or other supports and structures of every nature, except the work of restoring the northerly portion of pier No. Nine (9), made necessary by the operations of the Commissions, their agents, contractors or employees upon or adjacent to the parcels enumerated in this Article, is to be done at the expense of the Commissions, except as herein specifically provided to the contrary.

For the purpose of measuring the periods of occupancy provided for in the grants of temporary easements herein referred to, the several periods of occupancy shall commence respectively upon the dates to be named in the notices by the Chief Engineer of the Commissions to the Chief Engineer of the Railroad Company, when possession of the respective parcels is desired for the use of the Commissions, and shall end when the tracks, structures or other facilities of the Company upon such respective parcels have been restored to their former condition or to a condition acceptable to the Chief Engineer of the Railroad Company. If the Railroad Company shall fail to remove the tracks or other obstructions on the date or dates named in the said notices, then, for the purpose of measuring the period or periods of occupancy, the said period or periods shall not begin until the tracks or other obstructions have been removed. The Railroad Company shall use diligence in restoring its tracks, structures or other facilities after the completion of the work by the Commissions, its agents, contractors, or employees.

If the Commissions, their agents or contractors are unable to complete the various portions of the work to be constructed and completed upon any or all of the various parcels within or on which the State of New Jersey is given certain temporary rights and easements above referred to, prior to the expiration of the said rights and easements, the Railroad Company shall give the Commissions continued possession, for a reasonable time, of such parcel or parcels as may be necessary for them to have in order to complete their work. In such case or cases the Commissions shall pay and the Railroad Company shall accept, as full payment for rental and damages for such continued possession the respective sums specified in the following schedule for each day, including Sundays and holidays, of such continued possession of each respective parcel:

CONTRACT WITH ERIE RAILROAD COMPANY

|                      |                |                    |
|----------------------|----------------|--------------------|
| Parcel No. 25        | Drawing No. 13 | \$20.00 per day    |
| Parcel No. 21        | Drawing No. 13 | 10.00 per day      |
| Parcel No. 22        | Drawing No. 13 | 70.00 per day      |
| Parcels Nos. 23 & 24 | Drawing No. 13 | 10.00 each per day |
| Parcel No. 26        | Drawing No. 13 | 100.00 per day     |
| Parcel No. 27        | Drawing No. 13 | 125.00 per day     |
| Parcel No. 28        | Drawing No. 13 | 5.00 per day       |
| Parcel No. 30        | Drawing No. 13 | 1.00 per day       |
| Parcel No. 31        | Drawing No. 13 | 2.00 per day       |

If the Commissions shall find it necessary to use the westerly eighty-one feet and fourteen hundredths of a foot (81.14') of parcel No. Twenty-two (22) for a period in advance of that provided for in the grant of the temporary easement with respect to the said parcel, the Railroad Company shall consent to such previous occupation, not however, exceeding a period of one (1) year, without additional compensation therefor, and for the purpose of computing the terms of the easement with respect to parcel No. Twenty-two (22), any such time that might be required for the use of the said westerly eighty-one feet and fourteen hundredths of a foot (81.14') thereof, separate and apart from the remainder of the parcel, shall not be counted in determining the term of the said easement.

ARTICLE 6.

If the work of the Commissions is suspended for a period of more than sixty (60) days upon any or all of the parcels leased under Article 5 hereof, the Railroad Company may, at the expense of the Commissions, restore its tracks or structures to their former condition and usefulness. If such option is exercised, and when the Commissions are prepared to resume work, the Railroad Company shall remove its tracks or structures at the expense of the Commissions as provided in the first instance therefor, and, in the event of such resumption of work



after restoration of the railroad facilities, the Commissions shall be entitled, without an additional payment of rent therefor, to the further use of the said parcel or parcels for a period of time which shall be determined by deducting from the total term of the said lease or leases, as provided in Article 5 hereof, the time elapsed from the date when possession of the said parcel or parcels was given to the Commissions to the date when the tracks or structures were restored to their former usefulness.

Such provision for restoration shall not apply to the removal of the temporary construction trestle along the northerly side of pier No. Nine (9), parcel No. Twenty-two (22), unless the work of the Commissions is suspended for more than one (1) year, in which event such provision for restoration shall apply to the removal of the temporary construction trestle aforesaid and the restoration of the pier, but in the event of a suspension of the work of the Commissions for a period of less than one (1) year, the Railroad Company shall have the right to use the space under the trestle during such suspension of work.

If the Railroad Company elects not to exercise the option herein given to it and does not restore its tracks or structures at the expense of the Commissions during such period of suspension of the work of the Commissions, then the Commissions shall not be required to pay excess rental to the Railroad Company for the use of such parcel or parcels beyond the period of the easements herein granted, for a period equal to the time wherein the Railroad Company failed or neglected to restore its facilities in such parcel or parcels.

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#### ARTICLE 10.

The Railroad Company shall erect or cause to be erected and maintained at the end of all tracks which terminate

near the said shafts or near the excavations for the said tunnel or tunnels and appurtenances, bumping posts or other suitable and appropriate obstructions for the purpose of preventing damage from the operation of cars and locomotives on the said tracks. All permanent bumping posts or other suitable obstructions for the purpose of protecting the said shafts or ventilating equipment building are to be constructed by the Railroad Company at its expense. All temporary bumping posts or other suitable obstructions required for the said purposes during the progress of the work shall be considered as a part of the track work done for the benefit of the Commissions and shall be done at their expense.

#### ARTICLE 11.

Except as herein otherwise provided, the responsibility of the Commissions for all tracks, trestles or other surface or underground structures which they undertake herein to remove, relocate or reconstruct, shall cease after the Chief Engineer of the Railroad Company has approved such removal, relocation or reconstruction. If the said Chief Engineer does not approve such removal, relocation or reconstruction, or the manner in which the same or any part thereof was done, he shall indicate his disapproval thereof in writing to the Chief Engineer of the Commissions within sixty (60) days after he has been notified of the completion thereof, with specific and detail reasons for such disapproval. The failure of the Chief Engineer of the Railroad Company to give such notice shall be construed as an approval. The Commissions, however, shall continue to be responsible for the settlement of the ground, or any foundations, pipes, conduits, tracks or structures therein or thereon, in all cases where such settlement was not evident at the time of the approval of the reconstruction work by the Chief Engineer of the Railroad Company, and where such settlement is the result of the construction of the Tunnel.

ARTICLE 12.

Except in emergency, the Railroad Company shall, before undertaking to do any work hereunder at the expense of the Commissions (except as to such work as is specifically referred to in this agreement or shown on the plans and drawings annexed hereto), give to the Commissions written notice thereof and the Commissions shall have the right to inspect the premises wherein it is claimed such work is required and the manner in which such work is and is to be performed. In cases of emergency the Railroad Company may proceed with the work immediately, but it shall notify the Chief Engineer of the Commissions promptly of such action.

The Railroad Company shall furnish to the Commissions in connection with any work done hereunder at the expense of the Commissions, daily time slips showing the name and number of each workman employed at the site of the said work, the number of hours employed thereon, the character of work done and the rate of pay paid or to be paid to him, also a daily memorandum of the materials furnished for the work showing the amount and character of such materials. The cost of materials, together with the cost of handling or preparing such materials at points other than the site of the work being done for the Commissions, and the cost of transportation of the said materials, shall be furnished within a reasonable time after the completion of the work.

ARTICLE 13.

The Commissions shall proceed with and carry on the construction of the tunnel or tunnels and shafts and appurtenances in such a manner and in such order of procedure as to minimize, so far as they reasonably can, interference with the operations of the Railroad Company in its railroad yard east of Provost Street as generally outlined on drawing No. One (1), file N-146, dated July 28, 1921, hereto attached and made a part hereof.

The parties hereto agree that each will aid and assist the other in carrying on its work in the manner herein referred to by performing its obligations hereunder promptly and will not do, permit or suffer anything to be done on its part or on the part of its agents or employees to interfere unnecessarily or unreasonably with the said schedule of work.

ARTICLE 14.

Except as otherwise herein specifically provided, the Railroad Company shall not erect or suffer or permit any structures, other than tracks and other light structures hereafter to be erected over, above or beneath the permanent easements herein granted in such a manner that they rest directly upon or impose loads upon the Tunnel or its appurtenances so as to affect the stability of the same, unless and until it has first secured the approval of the Chief Engineer of the Commissions as to the type of structure and the method and manner of construction. The Railroad Company shall not make excavations adjoining the Tunnel structures, of such depth or in such manner or construct foundations so as to affect the stability of the said Tunnel structures unless and until it has first had the approval of the Chief Engineer of the Commissions as to the method of making the said excavations and of sustaining the sides thereof and of constructing the said foundations. As provided in Article 3 hereof, the Commissions shall have at all times during such construction the right of inspection and the right to stop the work if the said Tunnel structures are endangered.

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ARTICLE 17.

Before work is started upon the open cut on parcels Nos. One (1) and Thirteen (13), the Commissions shall acquire by purchase or condemnation for the purpose



of the construction and operation of the tunnel or tunnels and shafts provided for herein, from the owner thereof, a parcel of land lying northeasterly of the intersection of the center line of Twelfth Street produced, and the easterly line of Barnum Street, so called, designated as parcel No. Thirty-four (34), drawing No. Fifteen (15), file No. Fourteen (14), dated June 28, 1921, hereto attached, more particularly described as follows:

Beginning at Point No. One (1), in the center line of Twelfth Street produced, being the northerly property line of the Long Dock Company, which point is distant four hundred thirty (430) feet easterly from the easterly line of Provost Street, as measured along the said center line of Twelfth Street produced, said point also being the intersection of the center line of Twelfth Street produced with the westerly property line of the grantor; thence northerly, making an angle of ninety degrees two minutes ( $90^{\circ} 2'$ ) (interior), a distance of fifty-one feet and twenty-eight hundredths of a foot (51.28') to point No. Two (2); thence easterly, making an angle of seventy-six degrees, thirty-five minutes and twenty-four seconds ( $76^{\circ} 35' 24''$ ) (interior), a distance of one hundred feet and nine hundredths of a foot (100.09') to point No. Three (3); thence southeasterly, making an angle of one hundred seventy-three degrees, forty-two minutes and nine seconds ( $173^{\circ} 42' 09''$ ) (interior), a distance of eighty-three feet and fifty-four hundredths of a foot (83.54) to point No. Four (4), which point is in the said center line of Twelfth Street produced; thence westerly, along the said center line of Twelfth Street produced, making an angle of nineteen degrees, forty minutes and twenty-seven seconds ( $19^{\circ} 40' 27''$ ) (interior), a distance of one hundred seventy-six feet and two hundredths of a foot (176.02) to point No. One (1), the point or place of beginning, containing four thousand, nine hundred seventy-two (4,972) square feet of land more or less.

When the said land shall have been so acquired by the Commissions, they shall grant to the Railroad Company, its licensees and invitees a right to use the same for pedestrians, vehicles and for the location and relocation of pipe lines and conduits in, under, to, over and above the said land (including the right to lay and maintain a railroad track or siding thereon at grade and one above) and for the purpose of access from Twelfth Street to the property of the said Railroad Company. The manner in which any track (not shown on drawing No. One (1), File N-146), pipe lines and conduits are to be laid whether at, below or above grade, and the location thereof shall be subject to the approval of the said Chief Engineers.

Before the work is started upon the open cut on Parcel No. One (1), the Commissions shall acquire by purchase or condemnation for the purpose of the construction and operation of the tunnel or tunnels and shafts provided for herein, from the owner or owners thereof a strip of land eight (8) feet in width northerly of and along the northerly line of Twelfth Street or Twelfth Street produced, between the easterly line of Barnum Street, so called, and Provost Street, and also the northerly thirty (30) feet of the said Twelfth Street or Twelfth Street produced between the above mentioned points, unless such thirty (30) feet is now a public highway, for the purpose of providing over the said Twelfth Street or Twelfth Street produced, between the easterly line of Barnum Street, so called, and Provost Street, a highway thirty-eight (38) feet in width after the construction of the open cut in Twelfth Street or Twelfth Street produced, as intended by the Commissions except such part thereof as is herein provided to be used for the Tunnel structure.

When the said strip of land eight (8) feet wide, described in the foregoing paragraph, shall have been so acquired by the Commissions, the Commissions shall grant to the Railroad Company, a right of way for a track to be located in part thereon and shall grant to

the Railroad Company, its licensees and invitees, a right of way for pedestrians and vehicles, in, to and over the said lands for the purpose of access from Twelfth Street to the property of the said Railroad Company.

Unless the northerly thirty (30) feet of the said Twelfth Street or Twelfth Street produced described in the second preceding paragraph is now a public highway, the Commissions shall when such thirty (30) feet have been acquired by them, grant to the Railroad Company a right of way for a track to be located in part thereon and shall grant to the Railroad Company, its licensees and invitees, a right of way for pedestrians and vehicles in, to and over the said lands for the purpose of access from Twelfth Street to the property of the said Railroad Company. The use of the said lands by the Railroad Company shall at all times be subject to the relocation and maintenance of the existing sewer under the said lands.

The Commissions shall thereupon take such steps as may be necessary to dedicate for the purposes of a public street such lands as they are required by the three preceding paragraphs hereof to acquire, such dedication to be subject to the above described and aforesaid rights, to the track thereon, to the right of the Commissions to use the southerly two (2) feet and three (3) inches of the surface (and a strip not exceeding five (5) feet in width beneath the surface) of the said lands for Tunnel purposes, and to the right of the Commissions to use the said lands for access to the Tunnel structure and as a means of egress in case of an emergency, so that the highway so dedicated may connect with the roadway to be provided along the northerly boundary line of the lands of the Railroad Company to the east of Barnum Street, so called, for the purpose of providing adequate access to the tunnel ventilating buildings and also to be used in case of emergency as a means of egress from the Tunnel to the public streets.

Reference in this Article to the track in Twelfth Street or Twelfth Street produced, shall be understood to be limited in its express and inferential application and effect to that portion of the said track lying east of the easterly line of Provost Street.

The Railroad Company shall create, for its own use, not later than the date of opening the tunnel for public use, a right of way for a roadway and sidewalk of a minimum width of twenty-three (23) feet for pedestrians and vehicles along its northerly property line and running from the parcel referred to in this Article to be acquired by the Commissions, to pier No. Nine (9), or to the new pier when the same is constructed as provided in Article 8. The Railroad Company shall connect its right of way with the said parcel so that access may be had thereover between Twelfth Street and the said pier, and shall grant to the Commissions the right for the use of the same by pedestrians and vehicles so that the Commissions may have access thereover to their ventilating buildings, and so that the same may be used in case of emergency as a means of egress from the Tunnel to the public streets.

Neither party shall exercise in any manner the said right of passage and repassage so as to interfere with the free passage and repassage of the other parties, their contractors, employees, licensees, invitees or representatives through the said tract of land.



## CHAPTER V.

## SECURITY TO BE FURNISHED BY THE CONTRACTOR.

ARTICLE XXXIV.—Simultaneously with the execution of this contract the Contractor shall give security for the performance of his obligation by filing two bonds, one with the Comptroller of the State of New York, and one with the New Jersey Interstate Bridge and Tunnel Commission, each in the form annexed hereto and entitled “Form of Contractor’s Bond,” executed by the Contractor and by two or more sureties to be corporations or persons approved by the Commissions, and the bond to the State of New York shall be in the sum of two hundred fifty thousand dollars (\$250,000) and the bond to the New Jersey Interstate Bridge and Tunnel Commission shall be in the sum of two hundred fifty thousand dollars (\$250,000). The execution of these bonds must be duly proved before their delivery in form essential to proof to entitle a deed to record in the State of New York or in the State of New Jersey and full affidavits of justification of the sureties must be added. In case any of the sureties upon the bonds shall become insolvent or unable in the opinion of the Commissions to pay promptly the amount of such bonds to the extent to which such surety might be liable, then the Contractor within ten (10) days after notice by the Commissions to the Contractor shall, by supplemental bonds or otherwise, substitute another and sufficient surety approved by the Commissions in place of the surety so insolvent or unable. If the Contractor shall fail within such ten (10) days or such further time, if any, as the Commissions may grant to substitute another and sufficient surety, then the Contractor shall, if the Commissions so elect, be deemed to be in default in the performance of his obligations hereunder and upon the said bonds, and the Commissions in addition to any and all other remedies may terminate this contract or may bring any proper suit or proceeding against the Contractor and

Contractor’s  
bond.

the sureties or either of them or may deduct from any moneys then due or which thereafter may become due to the Contractor under this contract the amount for which the surety insolvent or unable as aforesaid shall have justified on the bonds, and the moneys so deducted shall be held by the Commissions as collateral security for the performance of the condition of the bonds.

Retained  
percentage  
may be held  
pending  
satisfaction  
of claims.

ARTICLE XXXVIII.—If at any time when the Contractor shall otherwise be entitled to the payment of all or a part of the retained percentage provided for under Article XL, there shall be pending any claim for injury or alleged injury to person or property occurring or alleged to have occurred on account of the work hereunder, whether by reason of the negligence, fault or default of the Contractor or otherwise or any claim or infringement or alleged infringement of patents, or any claim resulting from the nonpayment of labor or material, or any other claim on account of any neglect, fault or default or alleged neglect, fault or default of the Contractor including any claim mentioned in Article LIII for which it shall be claimed that the States or the Commissions or either of them shall be liable, then and in that event the said deposit, bonds or retained percentage, including all interest, dividends and other income thereafter accruing thereon, or such part thereof as the Commission may prescribe shall, upon the requirement of either Commission, be reserved by the said Comptroller or the said Commission, as the case may be, as security against such claim for a time not exceeding the time when such claims would be legally barred. If and when the liability of the States or the Commissions or either of them on such claim or claims shall have been established by a judgment of a court of competent jurisdiction or such claim or claims shall have been admitted by the Contractor to be valid, the amount of such claim or claims may be deducted from the said retained percentage, before payment thereof shall be made to the Contractor.

ARTICLE XL.—In addition there shall be deducted, as hereinafter provided, ten per centum (10%) of the amounts certified from time to time to be due to the Contractor which shall be held as further security for the faithful performance by the Contractor of all the conditions, covenants and requirements specified and provided for in this contract.

Retained  
percentages.

The payment of the retained percentage at any time shall be subject to the provisions of Article XXXVIII. The Contractor may from time to time withdraw portions of the amounts so retained upon depositing with the Comptroller or Comptrollers bonds or other acceptable securities which are lawful for the investment of funds of savings banks within the State of New York or the State of New Jersey, as the case may be, and shall be approved by the Commissions. All securities when deposited must be payable to, or run in favor of or be transferred to the Comptroller of the State of New York or the New Jersey Interstate Bridge and Tunnel Commission, as the case may be. In case any of the securities so deposited shall, in the opinion of the Commission in question at any time cease to be of the character of securities which are lawful for the investment of the funds of the savings banks within the State of New York or the State of New Jersey, as the case may be, or shall in the opinion of the Commissions, or either of them as the case may be, at any time become of less value than the value stated for it or them in the schedule, then within ten (10) days after notice to the Contractor of the objection of the Commission the Contractor shall either substitute therefor securities which shall be approved by the Commission as of the character aforesaid and as being of at least the value of the former securities to which the Commission shall have objected as such value was originally stated in the said schedule or shall deposit with the Comptroller of the State of New York or the New Jersey Interstate Bridge and Tunnel Commission, as the case may be, in cash the

#### PAYMENTS TO CONTRACTOR

amount of such value of such former securities as so originally stated. In case the Contractor shall not within said ten (10) days or such further time, if any, as the Commission may grant, substitute such new securities or make such deposit of cash, the Commission may require the Comptroller to deduct from any moneys then due or which thereafter may become due to the Contractor under this contract the amount of the original valuation of such securities objected to; and the Commission shall hold the moneys so deducted in lieu of such securities as if part of the original deposit as aforesaid. The securities so objected to shall upon such substitution of securities or deposit of cash in lieu thereof be returned to the Contractor.

The Comptroller of the State of New York and the New Jersey Interstate Bridge and Tunnel Commission shall from time to time collect all interest, dividends and other income on any securities deposited by the Contractor and shall pay the same when and as collected, to the Contractor. If the securities are in the form of coupon bonds, the coupons as they respectively become due shall be delivered to the Contractor. Said bonds, securities and cash deposit shall be subject to the same provisions as the retained percentage.

#### CHAPTER VI.

##### PAYMENTS TO CONTRACTOR.

Partial  
payments.

ARTICLE XLI.—In order to assist the Contractor to prosecute the work advantageously, the Engineer shall, from time to time, as the work progresses but not oftener than once a month, make in writing an estimate, such as in his opinion shall be just and fair, of the amount and value of the work done and materials furnished by the Contractor according to the terms of this contract, provided, however, that estimates may at any time be withheld or reduced, if in the opinion of the Engineer, the



#### PAYMENTS TO CONTRACTOR

work is not proceeding in accordance with this contract, or the Contractor is not complying with all of his obligations thereunder. The first such estimate shall be of the amount and value of the work done and materials furnished since the Contractor commenced the performance of this contract on his part. Every subsequent estimate except the final estimate shall be of the amount and value of the work done and materials furnished since the last preceding estimate was made, provided, however, that no such estimate shall be required to be made when, in the judgment of the Engineer, the total value of the work done and materials furnished since the last preceding estimate amounts to less than ten thousand dollars (\$10,000). The Engineer shall further include accepted steel delivered on the site of the work or on property owned or leased by the States, but not incorporated in the work, at the rate of seventy-five dollars (\$75) per ton of steel so delivered, but the quantity of such structural steel included in any partial estimate or estimates shall not exceed the quantity of such material, as determined by the Engineer, required for the ensuing six (6) months. Any material included in a partial estimate which may subsequently become lost, damaged or unsatisfactory shall be deducted from succeeding partial estimates. All such steel so accepted shall be and become the property of the States and the Contractor at his own expense shall promptly execute, acknowledge and deliver or cause to be executed, acknowledged and delivered to the Commissions for any and all such steel included in any partial estimate, proper bills of sale or other instruments in writing in a form and as required by the Commissions from the Contractor and from any person, firm or corporation manufacturing for, or selling or shipping or delivering to, the Contractor any such steel, conveying and assuring to the States title to such steel included in such estimate free from all liens and encumbrances, and containing the further assurances that

the manufacturer has been paid for the material, or that satisfactory arrangements for such payment have been made, and the Contractor at his own expense shall mark such steel as the property of the States and shall take such other steps, if any, as the Commissions may require or regard as necessary to vest title in the States to such steel free from all liens and encumbrances. No materials not incorporated in the work, excepting such steel, shall be included in any estimate.

Not by  
strict  
measurement.

ARTICLE XLII.—Partial estimates shall not be required to be made by strict measurement, but they may be made by measurement or by estimation, or partly by one method and partly by the other, and it shall be sufficient if they are approximate only.

Vouchers.

ARTICLE XLIII.—When each partial estimate is made and certified by the Engineer in writing to the Commissions, the respective Commissions shall prepare and certify one voucher each for forty-five per centum (45%) of the amount stated in such estimate or certificate of the value of the work done and materials furnished, each Commission retaining five per centum (5%) of each partial estimate.

The States shall, within thirty (30) days after the date of the certification of such vouchers by the Commissions, pay the same; provided, however, that the States, or either of their Commissions, may at all times reserve and retain from said partial estimates or any of them, in addition to all deductions above mentioned, any sum or sums which, by the terms hereof or of any law of the State of New York or the State of New Jersey is or may be authorized to be reserved or to be retained.

Final  
payment.

ARTICLE XLIV. Whenever, in the opinion of the Engineer, the Contractor shall have completely performed this contract on his part and no further work shall be required of him hereunder, the Engineer shall so certify

in writing to the Commissions and in his certificate shall state from actual measurements the whole amount of the work done by the Contractor and also the value of such work under and according to the terms of this contract. On the expiration of forty (40) days after the acceptance by the Commissions of the work herein agreed to be done by the Contractor and the filing of a certificate of the completion and acceptance of the work in the office of the Commissions, signed by the Engineer and the Chairman of each Commission, the Commissions shall cause to be paid to the Contractor the amount remaining after deducting from the amount stated in the last-mentioned certificate all such sums as shall heretofore have been paid to the Contractor under any of the provisions of this contract and also any sum or all such sums of money as by the terms hereof the States are or may be authorized or required to reserve or retain; provided that nothing herein contained shall be construed to affect the right, hereby reserved, of the Commissions to reject the whole or any portion of the aforesaid work, should the said certificate be found or known to be inconsistent with the terms of this contract or otherwise improperly given. All prior certificates upon which partial payments may have been made, being merely estimates, shall be subject to correction in the final certificate, which final certificate may be made without notice thereof to the Contractor or of the measurements upon which it is based.

ARTICLE XLV.—If the payment of the amount due the Contractor on any voucher shall be delayed beyond the time stipulated in Article XLIII in the case of partial payment, or Article XLIV in the case of final payment, the State whose voucher is delayed shall pay the Contractor interest on such amount at the rate of six per centum (6%) per annum for the period of such delay; it being understood that such payments of interest, if any,

Interest  
on delayed  
payments.

PAYMENTS TO CONTRACTOR

are to be in lieu of any claim of the Contractor for alleged damages for breach of contract or otherwise in case of delayed payments. The term for which interest shall be paid shall be reckoned, in the case of a partial payment from the thirtieth day after the certification of such voucher by the Commissions, and in case of a final payment from the fortieth day after the acceptance of the work by the Commissions to date of payment of the voucher. The date of payment of a voucher shall be considered the day on which the voucher is ready for payment as evidenced by the records of the Comptrollers of the State of New York and the State of New Jersey. If interest shall become due on any partial payment, the amount thereof shall be added to a succeeding payment by the Commission delaying such payment. If interest shall become due on a final payment, the amount thereof shall be paid on a supplementary voucher prepared by the Commission delaying such payment.

No estoppel.

ARTICLE XLVI.—The States shall not, nor shall any department or officer thereof, be precluded or estopped by any return or certificate made or given by the Commissions, the Engineer or other officer, agent or appointee thereof under any provision of this contract, from, at any time either before or after the final completion and acceptance of the work and payment thereof pursuant to any such return or certificate, showing the true and correct amount, quality and character of the work done and materials furnished by the Contractor or any other person under this contract, or from showing at any time that any such return or certificate is untrue and incorrect or improperly made in any particular or that the work and materials or any part thereof do not in fact conform to the specifications; and the States shall not be precluded or estopped, notwithstanding any such return or certificate and payment in accordance therewith, from demanding and recovering from the Contractor



for such damages as they may sustain by reason of his failure to comply with this contract or the specifications.

ARTICLE XLVII.—Neither the acceptance by the Commissions or their Engineer or any of their employees nor any order, measurement or certificate by the Engineer, nor any order by the Commissions for payment of money nor any payment for, nor acceptance of, the whole or any part of the work by the Engineer or the Commissions, nor any extension of time nor any possession taken by the Commissions or their employees shall operate as a waiver of any portion of this contract or of any power herein reserved to the Commissions or of any right to damages herein provided; nor shall any waiver of any breach of this contract be held to be a waiver of any other or subsequent breach.

No waiver.

ARTICLE XLVIII.—The acceptance by the Contractor of the last payment aforesaid shall be and shall operate as a release to the States from all claim and liability to the Contractor for anything done or furnished for, or relating to, the work, or for any act of neglect of the Commissions, the States or of any person relating to or affecting the work, except only the claim against the States for the remainder, if any there be, of the amounts kept or retained as provided in this contract.

Final payment to terminate liability of States.

ARTICLE XLIX.—If the Contractor shall claim compensation for any damages sustained by reason of any act or neglect of the States or the Commissions or their agents, he shall, within ten (10) days after the sustaining of such damage, make a written statement to the Commissions of the nature of the damages sustained. On or before the fifteenth day of the month succeeding that in which any such damage shall have been sustained the Contractor shall file with the Commissions an itemized statement of the details and amount of such damage, and, unless such statement shall be made as thus required, his

Contractor's claim for damage.

claim for compensation may in the discretion of the Commissions be forfeited and invalidated and he shall not be entitled to payment on account of any such damage.

## CHAPTER VII.

### CONTRACTOR'S LIABILITY FOR INJURIES TO PERSONS OR DAMAGE TO PROPERTY.

Contractor's  
liability for  
damages.

ARTICLE L.—The Contractor expressly admits and covenants to and with the States that the specifications and other provisions of this contract, if the work be done without fault or negligence on the part of the Contractor, do not involve any damage to surface, subsurface or overhead structures, foundations, walls or other parts of adjacent or abutting structures; and the Contractor will at his own expense make good any damage that shall, in the performance of the work, be done to surface, subsurface or overhead structures, foundations, walls or other parts of adjacent or abutting structures. The liability of the Contractor under this covenant is absolute and is not dependent upon any question of negligence on his part or on the part of his agents, servants or employees, and the neglect of the Commissions or their Engineer to direct the Contractor to take any particular precautions or to refrain from doing any particular thing shall not excuse the Contractor in case of any such damage.

It is the intention of the parties to this contract that, in addition to indemnifying the States against all claims for damages, the Contractor shall also be liable to the owners of adjacent or abutting property, buildings or structures and to all tenants or occupants of such buildings or structures for all physical injuries to property or person which may be occasioned by the work of the construction, even in cases where such owners, tenants or occupants have no legal claim against the States for such injuries.

ARTICLE LI.—The Contractor shall, during the performance of the work, safely maintain the traffic in railroad tunnel structures, on railroads, on streets, thoroughfares and other roadway and shall take all necessary precautions and place proper guards for the prevention of accidents and shall put up and keep at night suitable and sufficient lights.

Maintenance  
of traffic.

ARTICLE LII.—The Contractor shall be solely responsible for all physical injuries to person or property occurring on account of the work hereunder and shall indemnify and save harmless the States from liability upon any and all claims for damages on account of such injuries to person or property and from all costs and expenses in suits which may be brought against the States for such injuries to person or property; it being distinctly understood, covenanted and agreed that the Contractor shall be solely responsible and liable for and shall fully protect and indemnify the States against all claims for damages to person or property occasioned by or resulting from the methods or process of doing the work, whether such damages be attributable to negligence of the Contractor, of his employees or otherwise.

Indemnifica-  
tion for  
accidents.

ARTICLE LIII.—In case any claim shall be made by any person or corporation against the Contractor or the States for injury or alleged injury to person or property occurring or alleged to have occurred on account of the work hereunder, whether by reason of the negligence, fault or default of the Contractor or otherwise, or for any infringement or alleged infringement of patents or for any neglect, fault or default or alleged neglect, fault or default of the Contractor, the amount of such claim or so much thereof as the Commissions may deem reasonable shall, upon the requirement and in the discretion of the Commissions, be retained by the Commissions out of any moneys then due or thereafter growing due to the Contractor hereunder (in addition to the other sums

Money due  
Contractor  
may be  
retained to  
meet claims.

herein authorized to be so retained) as security for the payment of such claim or claims. If and when the liability of the States or the Contractor on such claim or claims shall have been established by a judgment of a court of competent jurisdiction or such claim or claims shall have been submitted by the Contractor to be valid, the said claim or claims may be paid from the amount so retained and the balance, if any, paid to the Contractor. Should there be any unsatisfied claim or claims for injury or alleged injury to person or property occurring or alleged to have occurred on account of the work hereunder, whether by reason of the negligence, fault or default of the Contractor or otherwise, or for any infringement or alleged infringement of patents or for any neglect, fault or default of the Contractor, at the time when the final voucher for the work is prepared and certified, the Commissions shall have the right to retain out of the final payment and to deduct from the amount of the final voucher a sum in their judgment sufficient to protect the States in regard to all unsatisfied claims as aforesaid, and in case the amount thus retained should be insufficient to pay the amount adjudicated to be due upon such claim or claims, the States may sue for and recover from the Contractor the amount or balance as a debt from the Contractor to the States. The Commissions may further, if in their judgment such a course is necessary or proper, at the time of preparing and certifying the final voucher and as a condition of preparing and certifying the same, require the Contractor to continue his bond or deposit or any part thereof as security against any such unsatisfied claims for a time not exceeding the time when such claim would be legally barred.

Examination  
of property.

ARTICLE LIV.—The Engineer shall cause a detailed examination of all adjacent, abutting, underground or overhead property to be made before construction is begun. The owner or tenant of each parcel or his or their duly authorized representative shall be invited whenever



such examination is made to be present by a notice in writing delivered to a person apparently in charge of the premises, and the Contractor or his duly authorized representative shall attend and with the Engineer shall make such detailed examination. A complete record of the existing conditions of each parcel shall be made in quadruplicate, signed by the Engineer and the Contractor. One record shall be retained by the owner, one by the Contractor and two by the Commissions. At such times as the Engineer may direct and upon the completion of the work or upon notice to the Engineer by the owner or tenant that physical injury has occurred, further examination shall be made and the findings recorded and filed as above.

ARTICLE LV.—All risk of loss or damage to the Works or to any part thereof or to any of the materials, plant, tools, appliances, supplies or other things used in doing the work prior to final completion is assumed and shall be borne by the Contractor, and any such loss or damage shall be made good by the Contractor at his own cost, and the work shall be carried forward by him in accordance with this contract without additional cost to the States by reason of such loss or damage.

Damage to  
Works during  
construction.

ARTICLE LVI.—The Contractor shall be responsible for any claims made against the States for any infringements of patents by the use of patented tools, articles or appliances in the performance or completion of the work, or by the use of any materials, process or method connected with the work, and he shall save harmless and indemnify the States from and against all costs, expenses and damages which the States shall be obliged to pay by reason of any such use or infringement.

Claim for  
infringement  
of patents.

CHAPTER VIII.

STATES TO SECURE CONTRACTOR AGAINST INTERFERENCE  
BY INJUNCTIONS. PROVISIONS FOR PLANT SITES.  
PAYMENT FOR AND OWNERSHIP OF PLANT.

Right of  
Contractor  
to perform  
stipulations  
of contract.

ARTICLE LVII.—The Commissions hereby covenant and agree to and with the Contractor that they will use their best endeavor to secure and assure to the Contractor, so long as the Contractor shall perform the covenants of this contract, the right to construct the Tunnel as prescribed in this contract, free of all right, claim or other interference, whether by injunction, suit for damages or otherwise on the part of any owner, abutting owner or other person; but not including any interference, legal or otherwise, by patentees or persons claiming to be patentees of tools, methods or appliances.

Plant sites.

ARTICLE LVIII.—The Commissions will provide for the Contractor without cost to him therefor within the periods limited in this contract for the use thereof sites for the construction of the tunnel, including plant, and for the receipt, storage and disposal of materials and for a right-of-way indicated as parcels A, B, C, D, E, F, G, 1, 2, 3, 4, 21, 25, 27 and 30, as shown on Contract Drawing No. 35. These parcels shall be used solely for the purpose of constructing the Vehicular Tunnel and the said sites and parcels or any of them as the Contractor may require shall be turned over to him upon his requisition therefor, as herein provided. The Contractor shall afford access to the City streets over Parcels A and B for the abutting property owners, as required by the Engineer.

The Commissions are in possession of all the parcels enumerated in this contract (with the exception of parcels A, B, C, D, E, F and G), under the provision of an agreement between the Commissions and the Erie Railroad Company, dated December 7, 1921. This agreement provides, among other things, the manner in which such parcels may be occupied and the work under this contract performed thereon or therein and the protection or the

assurance required against injury to persons or damage to this or other property of the Erie Railroad Company. For the convenience of the Contractor, there is annexed hereto, as an Appendix to the Specifications, certain excerpts from the said contract with the Erie Railroad Company all of which pertain to the obligations which have been assumed by the Commissions and must be assumed by the Contractor in the performance of the work herein. The Contractor, however, represents and admits that not only has he read the excerpts of the contract contained in the Appendix to the Specifications, which are merely inserted for his convenience, but that he has fully informed himself by reference to the entire contract between the Commissions and the Erie Railroad Company as aforesaid of all the obligations which have been assumed by the Commissions to the Erie Railroad Company so far as they affect the performance of the obligations of this contract, and he does assume for and on behalf of the Commissions all such obligations to the full extent of the Commissions' liability thereunder, it being the intent of this contract that every obligation assumed by the Commissions with respect to the occupancy of the said property of the Erie Railroad Company and the manner of the performance of the work thereunder shall be and are assumed by the Contractor as a part of this contract so far as they pertain thereto, except as otherwise herein specifically provided.

Parcels 2, 3, 4, 27 and G will be made available to the Contractor for the purpose of carrying on his operations within six (6) months after delivery of the Contract or at an earlier date as may be determined by the Engineer, and immediately upon being put in possession of these parcels, the Contractor shall begin work on these sites. If, for any reason whatsoever, the occupancy by the Contractor of Parcels 27 and G shall exceed the periods provided under this Contract, the Contractor will be required to pay the cost of rentals elsewhere herein provided for Parcel 27 and the sum of One Hundred Dollars (\$100) per month for Parcel G. The entire area of Parcel 27 is

available for the Contractor's use, except that if, during the period of this Contract, the Erie Railroad begins the construction of the proposed pier, the Railroad may occupy a strip 40 feet wide along the river bulkhead.

Parcels 1, 21, 25 and 30 will be made available to the Contractor for the purpose of carrying on his operations within thirty (30) days after requisition therefor. The periods of occupancy by the Contractor are set forth on the drawings, and in case the Contractor shall, for any reason whatsoever, occupy Parcels 21, 25 and 30 for longer periods than those fixed herein, the Contractor shall pay all expense for rentals or damages for such additional occupancy as elsewhere herein provided.

Subject to the acquirement by the Commissions of the necessary property, including easements and rights of way, both temporary and permanent, Parcels A, B, C, D, E and F will be made available to the Contractor for the purpose of carrying on his operations within thirty (30) days after requisition therefor. The periods of occupancy by the Contractor are set forth on the drawings, and in case the Contractor shall, for any reason whatsoever, occupy Parcels C, E and F for longer periods than those fixed herein, the Contractor shall pay all expense for rentals or damages for such additional occupancy.

The manner of the performance of the work in the Yard of the Delaware, Lackawanna and Western Railroad Company shall be under the direction of the Chief Engineer of the Commissions as he may determine to be necessary in order to reduce or eliminate inconvenience and interference to the Delaware, Lackawanna and Western Railroad Company in the operation of its yard or to reduce the hazard of injury to persons or damage to property in the performance of the work.

Upon delivery of Parcel A to the Contractor, all buildings and structures thereon above the adjacent sidewalk level shall become his property and he shall remove and dispose of the same at his own expense. In clearing this site, the Contractor shall safeguard the walls, floor beams,



foundations and other parts of adjacent structures or the remaining portions of buildings not on the plant site, and will be required to shore and support the same and do such other work as may be necessary to put the structures in a safe condition. The Contractor will not be required to build new walls or do such other work as may be necessary to put the remaining portions of buildings in a serviceable condition.

All services, such as electricity, water, gas, steam, heat, etc., shall be disconnected by the Contractor and any and all expense directly or indirectly incurred thereby shall be borne by him. Upon disconnecting such services, the Contractor shall furnish the Commissions certificates from the proper City authorities, or owners, stating that the work of disconnecting has been done in a satisfactory manner.

During the removal of the buildings, the Contractor shall build proper platforms, chutes, fences and guards to fully protect the public. Fences and guards shall be indicated at night by suitable and sufficient lights. If required by the Engineer, a watchman shall be provided by the Contractor.

Upon completion of the work under this contract, these parcels shall be turned over to the Commissions with the basements, or other underground openings, backfilled with material of a quality specified in Sections 164-1 to 164-3 to the level of the curb, or the surface of the surrounding ground, as the case may be.

The right to the possession and use of the aforesaid parcels which are granted to the Contractor herein shall be subject to such rights therein and thereto as the Commissions may hereunder desire to grant to other contractors under subsequent contracts for the construction of the Vehicular Tunnel. Such rights as may hereunder be granted to other and subsequent contractors however, shall not unduly interfere with or preclude satisfactory progress of the work under this contract.

In the event of a default by the Contractor hereunder

he shall forthwith surrender possession of the parcels herein enumerated to the Commissions without the necessity of legal or other proceedings therefor and promptly upon receipt of a notice of default given as herein provided.

At the commencement of the period of occupancy of the said parcels a joint survey of their condition shall be made by the Contractor and the Engineer and a proper record thereof kept by each and at the completion of the work hereunder or at the time of default, if any, another joint survey shall be made by the Contractor and the Engineer, which said survey shall determine the work of restoration which is to be done by the Contractor. Before making alterations in the physical structures on any of the parcels the Contractor shall submit to the Engineer, for his approval, the plans for such alterations.

Ownership  
of plant.

All the plant, materials, tools, appliances, equipment, supplies and property provided by the Contractor for his use in or for the construction or maintenance of the work shall, as soon as placed in or upon the work or the site of the work, absolutely be and become the property of the Commissions and no part of such plant, materials, tools, appliances, equipment, supplies or property shall be removed from the work or the site of the work without the previous permission of the Engineer, except as hereinafter in this Article provided, but the Contractor shall have the right to use the same for the purpose of his work and he shall keep the same in good repair. If the Contractor shall with the previous permission of the Engineer so remove any part of the plant or any other such material or thing so provided by the Contractor, the title to the same shall upon such removal revert in the Contractor. If the Engineer shall at any time certify to the Commissions that the plant or any part thereof or any other such material or thing provided by the Contractor and remaining on the work or the site of the work is no longer required for the performance of the work and may be removed without danger or injury to the Tunnel, the Commissions shall have the right to require the Con-

Removal  
of plant.

tractor to remove and take away the same forthwith at the Contractor's expense, and the title to the same shall upon such removal revert in the Contractor. And whenever the Contractor shall have fully completed the Works according to the terms of this contract and the Commissions shall so certify, the Contractor shall remove any such plant and any other such material or thing so provided by the Contractor and then remaining on the work which in the opinion of the Commissions may be removed without danger or injury to the Tunnel and the title to the same shall upon such removal revert in the Contractor. If the Contractor shall be declared by the Commissions to be in default as provided in Article LXVIII, the Contractor shall forthwith surrender and deliver to the Commissions, according to the requirements of the Commissions, any or all of the materials, plant, tools, appliances, equipment, supplies and property provided by the Contractor for the purpose of his work and the Commissions, its contractors and agents, shall have the right to take possession of and use the same as the property of the Commissions without liability for waste or destruction thereof and without the obligation to account therefor; and in case this contract shall be declared at an end by the Commissions as provided in Article LXVIII the Contractor shall forthwith surrender and deliver to the Commissions all the materials, plant, tools, appliances, equipment, supplies and property provided by the Contractor for the purpose of his work and the Commissions, its contractors and agents, shall have the right to take possession of and use the same as the property of the Commissions without liability for waste or destruction thereof and without the obligation to account therefor; subject only to the condition that whenever the Tunnel, which the Contractor herein agrees to construct with its appurtenances and the other work which the Contractor herein agrees to perform shall have been completed, the Commissions, if they shall be of opinion that any plant, materials, tools, appliances, equipment, supplies or property so provided and placed by the Contractor and then remaining (if there be any) shall no longer

Surrender of  
plant in case  
of default.

be necessary for the construction of said portion of said Tunnel or the performance of such other work and may be removed without danger or injury to said Tunnel, shall by resolution so declare and shall give notice of its finding to the Contractor and the Contractor within thirty (30) days after such notice, provided that he shall have first paid to the Commissions all sums owed by him to the Commissions, may remove such plant, materials, tools, appliances, equipment, supplies or property so provided and placed and then remaining which in the opinion of the Commissions is no longer necessary and may be removed as aforesaid, in such condition as the same may then be, and the title to such plant, materials, tools, appliances, equipment, supplies or property, in such condition as the same may then be, shall upon the removal of all such plant and other materials and things revert in the Contractor; but if the Contractor shall fail to remove all such plant and other materials and things as aforesaid, title shall remain in the Commissions.

For the further assurance of the faithful performance of this Article the Contractor will from time to time, upon the demand of the Commissions, execute such further instruments, writings or assurances as may be necessary for the effectual performance of the intent of this Article. The form and substance of such instruments, writings or assurances shall be determined by the Commissions.

No liens on Contractor's plant.

ARTICLE LIX.—At the time of the letting of the contract, or before any payment shall be due to the Contractor, or at any time during the course of operation, the Contractor shall satisfy the Commissions of his ownership of the plant, materials, tools, appliances, equipment, supplies or property, or any part thereof, referred to herein, and if the Commissions so order, no moneys shall be due him hereunder until all liens or encumbrances on the said plant, materials, tools, appliances, equipment,



supplies or property, or any part thereof, which tend in any way to limit or reduce the ownership of the Commissions therein shall have been satisfied.

ARTICLE LX.—If the Contractor shall furnish other sites in addition to those provided pursuant to the provisions of Article LVIII for the installation or maintenance of air compressing plant, or auxiliary machinery, then and in that event, in order to secure and assure to the Commissions free and clear title to, and full control of, all plant, materials, tools, appliances, equipment, supplies and property provided by the Contractor for his use in or for the construction or maintenance of the work and placed in or upon any such site, the Contractor shall lease, or procure a lease, free from encumbrances, to the Commissions, of all such sites provided by the Contractor, such lease to be in such form and to contain such provisions (including provision for the protection and indemnification by the Contractor of the States, and the Commissions and the members of the Commissions against claims by reason of such lease or by reason of anything done or permitted in or upon the leased sites) as the Commissions may require, the term of such lease to be for such period as the Commissions may deem necessary for the completion of the Works and the rental for the full term to be the sum of one dollar. The Contractor shall also take such other steps, if any, as the Commissions may in their discretion require for the purpose of securing and assuring to the Commissions free and clear title to all such plant, materials, tools, appliances, equipment, supplies and property provided or placed upon such sites and for the purpose of securing and assuring to the Commissions the control thereof, particularly the right to take possession of and use the same in the event that the Commissions shall declare the Contractor to be in default or declare this contract at an end as provided in Article LXVIII. In case the Commissions shall de-

Contractor's  
plant on  
property  
other than  
provided for  
in this  
contract.

clare the Contractor to be in default as provided in Article LXVIII, and shall demand possession of any of said sites or any part thereof, the Contractor shall forthwith quit and surrender said sites or such part thereof; and in case the Commissions shall declare this contract at an end, as provided in Article LXVIII, the Contractor shall forthwith quit and surrender said sites. In case the Contractor shall fail to quit and surrender any of said sites or any part thereof when required so to do, the Commissions in addition to all other remedies, shall have the right to remove the Contractor from said sites or such part thereof and to charge the expense of such removal to the Contractor and to deduct such expense from any moneys then due or thereafter becoming due to the Contractor hereunder. And neither the Commissions nor any member of the Commissions nor the Engineer or any of his assistants or subordinates shall be liable for any damage resulting to the Contractor from such removal, whether occasioned by negligence in the manner of removal or otherwise.

## CHAPTER IX.

### TIME FOR COMPLETION, DAMAGES FOR DELAY, ETC.

Commence-  
ment and  
completion  
of work.

ARTICLE LXI.—Time is of the essence of this contract. The Contractor shall begin actual work within fifteen (15) days after the date of the delivery of the contract and shall henceforth prosecute the work continuously and diligently. The entire work covered by this contract shall be completed in all respects within eighteen (18) months from the date of the delivery of the contract.

Damage for  
delay.

ARTICLE LXII.—In the event of delay in completion of any work ordered hereunder beyond the period herein prescribed or beyond the period to which such time may be extended by resolution of the Commissions for good cause shown, the States shall be paid damages for such

delay. Inasmuch as the amount of such damages will be extremely difficult to ascertain, especially in view of the fact that the construction of the Tunnel is a part of the construction of the Vehicular Tunnel and that any delay in the construction of said Tunnel may delay the construction and completion of said Vehicular Tunnel, it is hereby expressly agreed that such damages shall be liquidated and paid as follows:

The Contractor shall pay to the States for each and every day, except Sundays and legal holidays, that he shall be in default in completing the entire work to be done under this contract, the sum of one thousand dollars (\$1,000), which sum is hereby agreed upon not as a penalty but as liquidated damages which the States will suffer by reason of such default. The States shall have the right to deduct such amounts from any moneys due or which may thereafter become due to the Contractor under this contract. But in case the Contractor shall be actually and necessarily delayed by reason of any injunction or by any interference of public authority or by the suspension of the work by the Commissions as provided in Article LXV, and in case the Contractor cannot with reasonable diligence make up for the delay so occasioned by speedier work when the Contractor shall not so be delayed, then the said date for completion shall, except as hereinafter provided, be extended by resolution of the Commissions to a date later than the expiration of the said period of eighteen (18) months by the amount of the time of such delay as determined by the Commissions.

ARTICLE LXIII.—No injunction or interference of public authority shall be ground for such extension unless and until the Contractor shall give the Commissions notice of the injunction or other cause of delay, with copies of the injunction or other orders and of the papers upon which the same shall have been granted, and no extension shall be granted except for the delay

Commissions  
may intervene  
in case of  
injunctions.

occasioned after the giving of such notice. Nor will any extension be granted in any case unless the Contractor shall prove to the satisfaction of the Commissions all the facts which entitle him to such extension. The Commissions and the States or either shall be accorded the right to intervene or become a party to any suit or proceeding in which any such injunction shall be obtained and to move to dissolve the same or otherwise, as the Commissions or the States may deem proper. If required by the Commissions, counsel to the Commissions shall be authorized by the Contractor to appear for that purpose as counsel or attorneys for him.

Time for completion may be changed.

ARTICLE LXIV.—The time stipulated within which to complete the Tunnel is based upon the quantities of the various items entering into the work as stated in the Contractor's Proposal, which are given solely for the purpose of classifying bids. In case these quantities are exceeded or diminished, then an extension or diminution of the time for the completion of the Tunnel shall be made. It is, however, understood and agreed that in case an increase in any one item is balanced or offset by diminution of other items, no change in the term shall be made, and in any event the Commissions shall determine the amount of extension or diminution of time in respect of the relative increase or reduction in the quantities involved in the final completion of the Tunnel.

Suspension of work.

ARTICLE LXV.—The Commissions reserve the right of temporarily suspending the execution of the whole or any part of any work ordered to be performed hereunder, if they shall deem it for the interest of the States so to do, without compensation to the Contractor for such suspension other than extending the time for completing the work as hereinbefore provided as much as it may have been delayed by such suspension.

Extensions not cumulative.

ARTICLE LXVI.—Only the actual delay necessarily resulting from one or more of the causes above mentioned



shall be ground for extension of time, and in case the Contractor shall be delayed at any time or for any period by two or more of the causes above mentioned, only one period of extension, if any, shall be granted for such delay and the Contractor shall not be entitled to a separate extension for each one of the causes so operating, it being understood that only the actual period of necessary delay, as determined by the Commissions irrespective of the number of causes contributing to produce such delay, will be ground for extension of time.

ARTICLE LXVII.—Permission to the Contractor to proceed with and finish the work or any part of it after the time fixed for its completion or after the date to which the time for completion may have been extended, or the making of payments to the Contractor after any of such periods, shall in no wise operate as a waiver on the part of the States of any of their rights under this contract.

Permission to complete contract, no waiver.

## CHAPTER X.

### REMEDIES IN CASE OF CONTRACTOR'S DEFAULT.

ARTICLE LXVIII.—If any work to be done under this contract shall be abandoned by the Contractor, or if this contract shall be assigned or the work sublet by him otherwise than as herein specified, or if the Contractor shall not comply with such orders as may from time to time be given by the Commissions or the Engineer with respect to the work, or if the Contractor shall violate any of the provisions or covenants of this contract or of the specifications, or shall not execute the same in good faith and in accordance with the terms hereof, or if at any time the Engineer shall certify in writing to the Commissions that in his opinion suitable and sufficient materials, plant, power, tools, supplies or other means of construction are not provided, or that a sufficient number of workmen are not employed in the execution of the

In cases of default.

work under this contract, or that in his opinion the work or any part thereof is not being carried on with such skill, diligence and dispatch as will insure the completion of the work within the time specified in this contract, or if any work be not fully completed within the time named in this contract for its completion or within the period to which the time for completion may be extended by the Commissions or (in view of the necessity for special skill and ample financial resources in the prosecution of the work), if the Contractor shall become insolvent or bankrupt or if his property or affairs shall be put in the hands of a receiver or receivers, then and in any of such cases the Commissions may upon not less than five (5) days' notice to the Contractor or upon such shorter notice as in the opinion of the Commissions may be justified,

(1) Declare the Contractor to be in default; and the Commissions may thereupon notify the Contractor, by a written notice, to discontinue all work or any part thereof under this contract, and thereupon the Contractor shall discontinue the work or such part thereof, and the Commissions shall thereupon have the right, either for the Contractor, for his account and at his risk, or otherwise as the Commissions may determine, to contract for the completion of the Works or such part thereof, either with or without public advertisement, or to place such and so many persons as they may deem advisable, by contract or otherwise, to work and complete the work herein described or such part thereof, to take possession of and use any or all of the materials, plant, tools, appliances, equipment, supplies and property of every kind provided by the Contractor for the purpose of his work, and to procure other materials, plant, tools, appliances, equipment, supplies and property for the completion of the Works or such part thereof, and to charge the expense of said labor and materials, plant, tools, appliances, equipment, supplies and property to the Contractor. The expense so charged may be deducted

and paid by the States out of such moneys as may be due or may at any time thereafter grow due to the Contractor under and by virtue of this contract. And the Contractor shall, upon the completion of the Works or such part thereof or from time to time during the course of the completion of the Works, or such part thereof, as the Commissions may require, forthwith pay to the States, with interest, the excess, if any, of the cost to the States of the completion of the Works or such part thereof over the amount payable to the Contractor for the same work and materials under the terms of this contract. And the completion of the Works or such part thereof by the Commissions shall not release or discharge the Contractor from liability with respect to the remainder of the work or any other obligation or liability hereunder; and when any particular part of the work is being carried on by the Commissions by contract or otherwise, under the provisions of this paragraph (1), the Contractor, unless he shall have been directed to discontinue all work, shall continue the remainder of the work in conformity with the terms of this contract and in such manner as in nowise to hinder or interfere with other contractors of the Commissions or with the persons or workmen employed, as above provided, by the Commissions, by contract or otherwise, to do any part of the work or to complete the same under the provisions of this paragraph. Or

(2) Declare this contract at an end except as to the liability of the Contractor hereinafter in this paragraph provided for; and the Commissions shall thereupon have the right to contract for the completion of the Works, either with or without public advertisement, or to place such and so many persons as they may deem advisable, by contract or otherwise, to work and complete the work herein described, to take possession of and use all the materials, plant, tools, appliances, equipment, supplies and property of every kind provided by the Contractor

for the performance of his work and to procure other materials, plant, tools, appliances, equipment, supplies and property for the completion of the same. And in case the expense to the States of completing the Works (including the expense of procuring such other materials, plant, tools, appliances, equipment, supplies and property) shall exceed the amount which would have been payable to the Contractor for the same work and materials under this contract if this contract had been completed by the Contractor, he shall, upon the completion of the Works or from time to time during the course of the completion of the Works as the Commissions may require, pay the amount of such excess, with interest, to the States; and in case such expense shall be less than the amount which would have been payable to the Contractor for the same work and materials under this contract if this contract had been completed by the Contractor, he shall forfeit all claim to the difference. And the Contractor shall also pay to the States the amount of any claim for which the States shall be liable for injury to person or property occurring on account of any work done by the Contractor under this contract, whether by reason of the negligence, fault or default of the Contractor or otherwise, or for infringement of patents or for any neglect, fault or default of the Contractor, and shall also pay to the States the amount of any other expense which the States may incur or be liable for, and the amount of any payment which the States may be required to make, and the amount of any loss or damage which the States may incur or suffer, by reason of any neglect, fault or default of the Contractor. Or

(3) The Commissions may require the surety or sureties to perform and complete the Works or such parts thereof as the Commissions may require, under the terms of this contract. Or



(4) The States may also proceed, as to the Commissions shall seem proper, upon the bonds or other security in its possession. And

(5) The States may also bring any suit or proceeding for specific performance or for injunction or to recover damages or to obtain any other relief or for any other purpose proper under this contract.

ARTICLE LXIX.—In case the Commissions shall by contract or otherwise complete the Works or any part thereof under the provisions of Article LXVIII, the Engineer, upon the completion of the Works or such part thereof or at any time thereafter upon demand in writing by either party hereto or from time to time during the course of the completion of the Works or such part thereof upon demand by the Commissions, shall certify to the amount of the expense incurred by the States in the completion of the Works or such part thereof, and said certificate shall be final and conclusive and admissible in evidence against the Contractor in any litigation arising or growing out of this contract.

Engineer's  
certificate of  
expense.

ARTICLE LXX.—The States may avail themselves of each and every remedy herein specifically given to the States or now or hereafter existing at law or in equity, and each and every such remedy shall be in addition to every other remedy so specifically given or otherwise so existing and may be exercised from time to time and as often and in such order as may be deemed expedient by the Commissions, and the exercise, or the beginning of the exercise, of one remedy shall not be deemed to be a waiver of the right to exercise, at the same time or thereafter, any other remedy, except that no two inconsistent remedies shall be exercised at the same time.

States may  
use all  
remedies.

IN WITNESS WHEREOF, this contract has been executed by the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, in and by authority of a resolution duly adopted by the

#### TESTIMONIUM

Commission, and these presents signed by the Chairman and attested by the Secretary, and by the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, in and by authority of a resolution duly adopted by the Commission and these presents signed by the Chairman and attested by the Secretary, and the Contractor has\* (hereunto set his hand and seal) (caused its corporate seal to be hereto affixed and these presents to be executed by its President and attested by its Secretary by virtue of a resolution duly adopted by its Board of Directors) the day and year first above written.

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\*If the Contractor is an individual, use the words enclosed in the first bracket; if a corporation, use the words enclosed in the second bracket.

TESTIMONIUM

FOR THE STATE OF NEW YORK  
NEW YORK STATE BRIDGE AND TUNNEL COMMISSION

By

.....  
Chairman

Attest:

.....  
Secretary

FOR THE STATE OF NEW JERSEY  
NEW JERSEY INTERSTATE BRIDGE AND TUNNEL COMMISSION

By

.....  
Chairman

Attest:

.....  
Secretary

CONTRACTOR

..... (Seal)  
(If corporation, name of corporation)

.....  
President

Attest:

.....  
Secretary

ACKNOWLEDGMENT

State of New York, }  
County of New York, } ss.

On this                      day of                      , 1924, before me personally appeared George R. Dyer and Morris M. Frohlich, to me known and known to me to be the said George R. Dyer the Chairman and the said Morris M. Frohlich the Secretary of the New York State Bridge and Tunnel Commission; and the said George R. Dyer and Morris M. Frohlich being by me duly sworn did depose and say each for himself and not for the other; the said George R. Dyer that he resides in the Borough of Manhattan, in the City, County and State of New York; that he is Chairman of the said Commission and that he subscribed his name to the foregoing contract by virtue of the authority thereof; and the said Morris M. Frohlich that he resides in the Borough of Manhattan, in the City, County and State of New York; that he is the Secretary of the said Commission and that he subscribed his name thereto by like authority.

.....  
.....  
.....



ACKNOWLEDGMENT

State of New York, }  
County of New York, } ss.

On this            day of            , 1924, before me personally appeared Theodore Boettger and John C. McEnroe, to me known and known to me to be, the said Theodore Boettger, the Chairman and the said John C. McEnroe the Secretary of the New Jersey Interstate Bridge and Tunnel Commission; and the said Theodore Boettger and John C. McEnroe being by me duly sworn did depose and say each for himself and not for the other; the said Theodore Boettger that he resides in the Town of Hackensack, Bergen County, New Jersey, that he is Chairman of the said Commission and that he subscribed his name to the foregoing contract by virtue of the authority thereof; and the said John C. McEnroe that he resides in the City of Newark, Essex County, New Jersey; that he is the Secretary of the said Commission and that he subscribed his name thereto by like authority.

.....  
.....  
.....

ACKNOWLEDGMENT

State of New York, }  
County of New York, } ss.

On this                      day of                      , 1924, before me  
personally came                      to me known and  
known to me to be the individual described in and who  
executed the foregoing instrument, and he duly acknowl-  
edged to me that he executed the same.

.....  
.....  
.....

State of New York, }  
County of New York, } ss.

On this                      day of                      , 1924, before me  
personally appeared  
to me known, who being by me first duly sworn did de-  
pose and say that he resides in  
in the State of                      , that he is the  
of  
                    , the corporation described in and  
which executed the foregoing instrument; that he affixed  
the corporate seal of said corporation; that one of the seals  
affixed to said contract is such corporate seal and that it  
was affixed thereto by order of the Board of Directors of  
said corporation and that he signed his name thereto by  
like order.

.....  
.....  
.....

FORM OF CONTRACTOR'S BOND.

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

as principal, and

as sureties, are hereby held and firmly bound unto the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, in the penal sum of two hundred fifty thousand dollars (\$250,000) for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this                      day of                      , 1924.

The condition of the above obligation is such that whereas the above named principal did on the  
day of                      , 1924, enter into a contract with the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, AND the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, which said contract is made a part of this bond the same as though set forth herein:

Now, if the said

shall well and faithfully do and perform the things agreed by                      to be done and performed according to the terms of said contract, and shall pay all lawful

FORM OF CONTRACTOR'S BOND

claims of subcontractors, materialmen and laborers, for labor performed and materials furnished in the carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety for value received hereby stipulates and agrees that any modifications, omissions, additions, or extensions of time in or to the said contract or in or to the plans and specifications therefor shall in no wise affect the obligations of said surety and its bond and it does hereby waive notice of any such modifications, omissions, additions, and extensions.

IN WITNESS WHEREOF, the Contractor and the Sureties have hereunto set their hands and seals and such of them as are corporations have caused their respective seals to be hereto affixed and these presents to be attested by the proper officers this                      day of                      ,  
1924.



FORM OF CONTRACTOR'S BOND

(Affix Sureties' Acknowledgments and Justifications)

FORM OF CONTRACTOR'S BOND

FORM OF CONTRACTOR'S BOND.

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned ,

as principal, and

as sureties, are hereby held and firmly bound unto the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, in the penal sum of two hundred fifty thousand dollars (\$250,000), for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this                      day of                      , 1924.

The condition of the above obligation is such that whereas, the above named principal did on the day of                      , 1924, enter into a contract with the New Jersey Interstate Bridge and Tunnel Commission, acting for and in behalf of the State of New Jersey, AND the New York State Bridge and Tunnel Commission, acting for and in behalf of the State of New York, which said contract is made a part of this bond the same as though set forth herein:

Now, if the said

shall well and faithfully do and perform the things agreed by                      to be done and performed according to the terms of said contract, and shall pay all lawful claims of subcontractors, materialmen and laborers, for labor performed and materials furnished in the carrying forward, performing or com-

FORM OF CONTRACTOR'S BOND

pleting of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety for value received hereby stipulates and agrees that any modifications, omissions, additions or extensions of time in or to the said contract or in or to the plans and specifications therefor shall in no wise affect the obligations of said surety and its bond and it does hereby waive notice of any such modifications, omissions, additions and extensions.

IN WITNESS WHEREOF, the Contractor and the Sureties have hereunto set their hands and seals and such of them as are corporations have caused their respective seals to be hereto affixed and these presents to be attested by the proper officers this            day of            , 1924.

FORM OF CONTRACTOR'S BOND

(Affix Sureties' Acknowledgments and Justifications)

## CONTRACTOR'S PROPOSAL.

FOR THE CONSTRUCTION OF THE NEW JERSEY APPROACH  
SECTION OF THE PROPOSED VEHICULAR TUNNEL.

To the New York State Bridge and Tunnel Commission,  
acting for and in behalf of the State of New York,  
and to the New Jersey Interstate Bridge and Tunnel  
Commission, acting for and in behalf of the  
State of New Jersey:

(1) The undersigned\*

do hereby, in pursuance of the invitation and information for bidders, copies of which are annexed hereto and made a part hereof, propose according to the terms thereof to enter into a contract in the form annexed hereto and made a part hereof with the State of New York and the State of New Jersey (hereinafter called the "States") acting by the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission (hereinafter called the "Commissions") for the construction of the New Jersey Approach Section of the proposed Vehicular Tunnel and to furnish all necessary labor, materials, plant, power, tools, equipment, supplies and other means of construction and perform all work mentioned in the said contract at the prices for the several items as given in the Schedule of Prices. It is understood that the quantities of the various items specified in the following schedule are given only as a basis for

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\*The bidder's name must be inserted here. If the bid is submitted by a corporation, the full legal title must be given here and a certified copy of the certificate of incorporation must be submitted, together with an affidavit showing the amount of stock paid in cash and the names and addresses of the directors and principal officers. If the bidder be a foreign corporation, proof must also be submitted of its authority to transact business in the State of New York and the State of New Jersey. If the bid is submitted by a partnership, the above blank must be filled up in the following form, "the firm of A. B. & Co., composed of A. B. C. D., etc." (giving the names of all the partners).



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the uniform comparison of bids and are not in any way guaranteed or represented as correct or intended to be relied upon and they shall not be taken as final and shall form no basis for any claim in case they do not correspond with the final measurements or quantities. It is further understood that the Commissions reserve the right to increase or diminish or to omit entirely any of the quantities of items.

THE CONTRACTOR'S PROPOSAL  
SCHEDULE.

\*(Bid prices are to be filled out both in writing and in figures.)

| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|---|--|
|      | EXCAVATION.  | \$     | c. |   |  |
| 2.   | For excavation, above mean high<br>water, the sum of<br><br>dollars<br>and cents,<br>per cubic yard.....                                     |        |    | 26,500  |  |
| 3.   | For excavation, below mean high<br>water, except for caisson ex-<br>cavation, the sum of<br><br>dollars<br>and cents,<br>per cubic yard..... |        |    | 58,500  |  |
| 5.   | For caisson excavation, the sum of<br><br>dollars<br>and cents,<br>per cubic yard.....   |        |    | 1,885   |  |
|      | MASONRY.   |        |    |   |  |
| 27.  | For concrete, as follows:  |        |    |   |  |
|      | (d) For concrete, the sum of<br><br>dollars<br>and cents,<br>per cubic yard.....   |        |    | 25,250  |  |
|      | (g) For pre-cast concrete<br>forms, the sum of<br><br>dollars<br>and cents,<br>per square foot.....  |        |    | 35,700  |  |

\*If there are discrepancies between the prices expressed in writing and the prices expressed in figures, the prices expressed in writing will be taken as the bid prices.

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| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|---|--|
|      |  | \$     | c. |   |  |
| 29.  | For mortar batches used in connection with placing concrete, the sum of<br><br>dollars<br>and cents,<br>per barrel of cement used... |        |    | 1,000   |  |
| 34.  | For brick masonry, the sum of<br><br>dollars<br>and cents,<br>per cubic yard.....  |        |    | 110   |  |
| 36.  | For granite curbing for tunnel roadway, the sum of<br><br>dollars<br>and cents,<br>per lineal foot.....                              |        |    | 4,220   |  |
| 37.  | For hollow terra cotta tile, the sum of<br><br>dollars<br>and cents,<br>per cubic yard.....  |        |    | 20  |  |
|      | PILES.   |        |    |   |  |
| 53.  | For timber piles, the sum of<br><br>dollars<br>and cents,<br>per lineal foot.....  |        |    | 17,500  |  |
|      | 214  |        |    |   |  |

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|------|---|--------|----|---|--|
|      |   | \$     | c. |   |  |
|      | TIMBER CRADLES.   |        |    |   |  |
| 59.  | For timber cradle to support<br>sewers, the sum of<br><br>dollars<br>and cents,<br>per thousand (1,000) feet<br>board measure ..... |        |    | 15  |  |
|      | WATERPROOFING.  |        |    |   |  |
| 60.  | For waterproofing, treated<br>woven fabric laid with as-<br>phalt, as follows:  |        |    |   |  |
|      | (b) For two (2) ply, the sum<br>of<br><br>dollars<br>and cents,<br>per square yard.....   |        |    | 1,400   |  |
|      | (c) For three (3) ply, the sum<br>of<br><br>dollars<br>and cents,<br>per square yard.....   |        |    | 2,430   |  |
|      | (d) For four (4) ply, the sum<br>of<br><br>dollars<br>and cents,<br>per square yard.....  |        |    | 11,400  |  |
|      | 215   |        |    |   |  |

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| Item | Classification   | Prices | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|---|--|
|      | (e) For five (5) ply, the sum<br>of<br>dollars<br>and cents,<br>per square yard.....   | \$ c.  | 50  |  |
|      | (f) For six (6) ply, the sum<br>of<br>dollars<br>and cents,<br>per square yard.....  |        | 1,900   |  |
| 62.  | For waterproofing, brick laid in<br>asphalt mastic, including one<br>(1) ply treated woven fabric,<br>the sum of<br>dollars<br>and cents,<br>per cubic yard..... |        | 1,885   |  |
|      | STEEL AND IRON.  |        |   |  |
| 70.  | For built-up and miscellaneous<br>steel-work, as follows:<br>(a) For built-up steelwork<br>and tie-rods, the sum of<br>dollars<br>and cents,<br>per ton .....    |        | 3,000   |  |
|      | 216  |        |   |  |



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| Item | Classification  | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|---|--------|----|---|--|
|      | (b) For bolts, including anchor bolts, and such miscellaneous malleable iron castings and wrought-iron fixtures, including ladders and hand-bars, either in the Tunnel or in subsurface structures (but not including pipe), as are not specifically provided to be paid for in other classified unit prices the sum of<br>dollars<br>and cents,<br>per ton ..... | \$     | c. | 3   |  |
| 72.  | For steel beams and shapes, with or without connections, the sum of<br>dollars<br>and cents,<br>per ton .....   |        |    | 545   |  |
| 73.  | For steel rods and bars for reinforcing concrete, the sum of<br>dollars<br>and cents,<br>per ton .....  |        |    | 385   |  |
|      | 217   |        |    |   |  |

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| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|---|--|
| 74.  | For wire mesh, the sum of<br>dollars<br>and cents,<br>per ton .....  | \$     | c. | 25  |  |
| 75.  | (f) For special steel structures, as follows:<br>(f) For air duct manhole frames with covers, complete, the sum of<br>dollars<br>and cents,<br>each .....<br>(g) For furnishing new riveted steel pipe sewers required, the sum of<br>dollars<br>and cents,<br>per ton ..... |        |    | 16  |  |
| 77.  | For copper steel, as follows:<br>(a) For plates, bolts, nuts and washers, the sum of<br>dollars<br>and cents,<br>per ton .....   |        |    | 335   |  |
| 81.  | For furnishing and placing new wrought-iron or steel pipe and pipe fittings in the tunnel or as required for subsurface changes, except pipe for electric conduits, the sum of<br>dollars<br>and cents,<br>per pound .....   |        |    | 19  |  |
|      |  |        |    | 2,000   |  |

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| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|---|--|
|      |  | \$     | c. |   |  |
| 85.  | For galvanized iron electric con-<br>duits in the tunnel, as fol-<br>lows:   |        |    |   |  |
|      | (a) For three-quarter ( $\frac{3}{4}$ )<br>inch conduits, the sum of<br>dollars<br>and cents,<br>per lineal foot.....        |        |    | 5,150   |  |
|      | (b) For one (1) inch conduits,<br>the sum of<br>dollars<br>and cents,<br>per lineal foot.....                                |        |    | 2,280   |  |
|      | (d) For one and one-half<br>( $1\frac{1}{2}$ ) inch conduits, the sum<br>of<br>dollars<br>and cents,<br>per lineal foot..... |        |    | 11,520  |  |
|      | (e) For two (2) inch conduits,<br>the sum of<br>dollars<br>and cents,<br>per lineal foot.....                                |        |    | 1,150   |  |
|      | (f) For two and one-half ( $2\frac{1}{2}$ )<br>inch conduits, the sum of<br>dollars<br>and cents,<br>per lineal foot.....    |        |    | 100   |  |
|      | 219  |        |    |   |  |

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| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approximate<br>Quantities | (This column not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|--|---|
|      | (g) For three (3) inch conduits,<br>the sum of                         | \$     | c. |  |   |
|      | dollars  |        |    |  |   |
|      | and cents,   |        |    |  |   |
|      | per lineal foot.....   |        |    | 100  |   |
|      | (h) For four (4) inch conduits,<br>the sum of                          |        |    |  |   |
|      | dollars  |        |    |  |   |
|      | and cents,   |        |    |  |   |
|      | per lineal foot.....   |        |    | 525  |   |
| 86.  | For miscellaneous galvanized<br>iron fixtures, as follows:             |        |    |  |   |
|      | (a) For outlet boxes (3½" x<br>3½" x 1½") in the tunnel,<br>the sum of |        |    |  |   |
|      | dollars  |        |    |  |   |
|      | and cents,   |        |    |  |   |
|      | each .....   |        |    | 35   |   |
|      | (b) For pull boxes (4" x 4" x<br>3") in the tunnel, the sum of         |        |    |  |   |
|      | dollars  |        |    |  |   |
|      | and cents,   |        |    |  |   |
|      | each .....   |        |    | 55   |   |
|      | (c) For pull boxes (6" x 10" x<br>4") in the tunnel, the sum of        |        |    |  |   |
|      | dollars  |        |    |  |   |
|      | and cents,   |        |    |  |   |
|      | each .....   |        |    | 30   |   |
|      | 220  |        |    |  |   |

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|------|---|--------|----|---|--|
|      |   | \$     | c. |   |  |
|      | (d) For pull boxes (8" x 12" x 4") in the tunnel, the sum of<br>dollars<br>and cents,<br>each .....   |        |    | 55  |  |
|      | (e) For curb guards, ladders,<br>handbars and miscellaneous<br>fixtures, the sum of<br>dollars<br>and cents,<br>per pound .....                                 |        |    | 8,500   |  |
|      | (f) For pull boxes (12" x 24" x 6") in the tunnel, the sum of<br>dollars<br>and cents,<br>each .....  |        |    | 10  |  |
|      | (g) For boxes for lights in the<br>tunnel, the sum of<br>dollars<br>and cents,<br>each .....  |        |    | 140   |  |
|      | CAST IRON.  |        |    |   |  |
| 91.  | For furnishing new cast-iron hub<br>and spigot pipe, straight<br>pipe, required for subsurface<br>changes, the sum of<br>dollars<br>and cents,<br>per ton ..... |        |    | 60  |  |
|      | 221   |        |    |   |  |



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|------|--|--------|----|--|---|
|      |  | \$     | c. |  |   |
| 92.  | For furnishing new cast-iron hub<br>and spigot pipe, special cast-<br>ings, required for subsurface<br>changes, the sum of<br><br>dollars<br>and cents,<br>per ton .....   |        |    | 6  |   |
| 95.  | For miscellaneous cast-iron fix-<br>tures required, as follows:  |        |    |  |   |
|      | (a) For new manhole and<br>catch basin fixtures, gratings,<br>drain covers and castings not<br>otherwise provided for, not<br>including pipe or pipe fittings,<br>the sum of<br><br>dollars<br>and cents,<br>per ton ..... |        |    | 5  |   |
|      | (b) For cast-iron exhaust air<br>ports, Type A-6, the sum of<br><br>dollars<br>and cents,<br>each .....  |        |    | 76   |   |
|      | (c) For cast-iron exhaust air<br>ports, Type E-3, complete, the<br>sum of<br><br>dollars<br>and cents,<br>each .....   |        |    | 106  |   |
|      | 222  |        |    |  |   |

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| Item | Classification   | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|--|--------|----|---|--|
|      |  | \$     | c. |   |  |
| 100. | For cast-iron water, discharge<br>or other tunnel service pipe,<br>as follows: |        |    |   |  |
|      | (a) For four (4) inch pipe,<br>the sum of                                      |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and  |        |    |   |  |
|      | cents,   |        |    |   |  |
|      | per lineal foot.....   |        |    | 270   |  |
|      | (b) For six (6) inch pipe, the<br>sum of                                       |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and  |        |    |   |  |
|      | cents,   |        |    |   |  |
|      | per lineal foot.....   |        |    | 3,150   |  |
|      | (c) For eight (8) inch pipe,<br>the sum of                                     |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and  |        |    |   |  |
|      | cents,   |        |    |   |  |
|      | per lineal foot.....   |        |    | 470   |  |
|      | (d) For ten (10) inch pipe,<br>the sum of                                      |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and  |        |    |   |  |
|      | cents,   |        |    |   |  |
|      | per lineal foot.....   |        |    | 290   |  |
|      | (e) For twelve (12) inch pipe,<br>the sum of                                   |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and  |        |    |   |  |
|      | cents,   |        |    |   |  |
|      | per lineal foot.....   |        |    | 50  |  |
|      | 223  |        |    |   |  |

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|------|--|--------|----|---|--|
|      |  | \$     | c. |   |  |
|      | BRONZE AND BRASS.  |        |    |   |  |
| 108. | For bronze and brass fixtures, as follows:                     |        |    |   |  |
|      | (a) For miscellaneous bronze fixtures, the sum of              |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and cents,   |        |    |   |  |
|      | per pound .....  |        |    | 500   |  |
|      | (b) For miscellaneous brass fixtures, the sum of               |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and cents,   |        |    |   |  |
|      | per pound .....  |        |    | 1,000   |  |
|      | LEAD.  |        |    |   |  |
| 109. | For lead, as follows:  |        |    |   |  |
|      | (a) For sheet lead for water-proofing and flashing, the sum of |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and cents,   |        |    |   |  |
|      | per pound .....  |        |    | 24,200  |  |
|      | TUNNEL DUCTS.  |        |    |   |  |
| 110. | For tunnel ducts, as follows:                                  |        |    |   |  |
|      | (a) For single way ducts, the sum of                           |        |    |   |  |
|      | dollars  |        |    |   |  |
|      | and cents,   |        |    |   |  |
|      | per duct foot.....   |        |    | 26,570  |  |

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|------|--|--------|----|---|--|
|      |  | \$     | c. |   |  |
|      | (b) For two way ducts, the sum<br>of<br>dollars<br>and cents,<br>per duct foot.....            |        |    | 100   |  |
|      | (c) For three way ducts, the<br>sum of<br>dollars<br>and cents,<br>per duct foot.....          |        |    | 600   |  |
|      | (d) For four way ducts, the<br>sum of<br>dollars<br>and cents,<br>per duct foot.....           |        |    | 100   |  |
|      | (e) For six way ducts, the sum<br>of<br>dollars<br>and cents,<br>per duct foot.....            |        |    | 1,700   |  |
|      | (f) For four (4) inch fiber<br>ducts the sum of<br>dollars<br>and cents,<br>per duct foot..... |        |    | 3,200   |  |
|      | 225  |        |    |   |  |

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|------|---|--------|----|--|---|
|      |   | \$     | c. |  |   |
|      | ASBESTOS MATERIALS.   |        |    |  |   |
| 112. | For asbestos materials and compounds, as follows:   |        |    |  |   |
|      | (a) For one-quarter ( $\frac{1}{4}$ ) inch asbestos lumber, the sum of dollars and cents, per square foot.....              |        |    | 450  |   |
|      | SUBSURFACE WATER PIPE AND GAS PIPE CHANGES.   |        |    |  |   |
| 120. | For changing cast-iron water pipe to avoid interference with the Tunnel (but not furnishing new pipe required), as follows: |        |    |  |   |
|      | (a) For pipe four (4) inches or under the sum of dollars and cents, per lineal foot.....                                    |        |    | 500  |   |
|      | (b) For six (6) inch pipe, the sum of dollars and cents, per lineal foot.....   |        |    | 1,150  |   |
|      | 226   |        |    |  |   |



(Bid prices are to be filled out both in writing and in figures.)

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|------|---|--------|----|---|--|
|      | SUBSURFACE ELECTRIC DUCT<br>AND CONDUIT CHANGES.  | \$     | c. |   |  |
| 126. | For changing creosoted wood<br>conduits to avoid interfer-<br>ence with the Tunnel, includ-<br>ing furnishing new conduits<br>required, as follows: |        |    |   |  |
|      | (a) For two (2) inch conduit,<br>the sum of   |        |    |   |  |
|      | dollars   |        |    |   |  |
|      | and cents,  |        |    |   |  |
|      | per lineal foot.....  |        |    | 2,300   |  |
|      | SEWER CHANGES.  |        |    |   |  |
| 130. | For laying vitrified pipe sewers,<br>including furnishing new pipe<br>required, as follows:   |        |    |   |  |
|      | (b) For six (6) inch pipe, the<br>sum of  |        |    |   |  |
|      | dollars   |        |    |   |  |
|      | and cents,  |        |    |   |  |
|      | per lineal foot.....  |        |    | 100   |  |
|      | (c) For twelve (12) inch pipe,<br>the sum of  |        |    |   |  |
|      | dollars   |        |    |   |  |
|      | and cents,  |        |    |   |  |
|      | per lineal foot.....  |        |    | 50  |  |
|      | 228   |        |    |   |  |

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|------|---|--------|----|---|--|
|      |   | \$     | c. |   |  |
|      | (f) For eighteen (18) inch pipe,<br>the sum of<br><br>dollars<br>and cents,<br>per lineal foot.....     |        |    | 600   |  |
| 133. | For laying cast-iron pipe sewers<br>but not including furnishing<br>new pipe required, as fol-<br>lows: |        |    |   |  |
|      | (b) For six (6) inch pipe, the<br>sum of<br><br>dollars<br>and cents,<br>per lineal foot.....           |        |    | 100   |  |
|      | (c) For eight (8) inch pipe, the<br>sum of<br><br>dollars<br>and cents,<br>per lineal foot.....         |        |    | 300   |  |
| 134. | For changing steel pipe sewers,<br>but not including furnishing<br>new pipe required, as fol-<br>lows:  |        |    |   |  |
|      | (a) For sixty (60) inch pipe,<br>the sum of<br><br>dollars<br>and cents,<br>per lineal foot.....        |        |    | 630   |  |
|      | 229   |        |    |   |  |

THE CONTRACTOR'S PROPOSAL  
SCHEDULE.

(Bid prices are to be filled out both in writing and in figures.)

| Item | Classification  | Prices |    | Engineer's<br>Estimated<br>Approx-<br>imate<br>Quantities | (This col-<br>umn not<br>to be used<br>by bidder.)<br>Amount |
|------|---|--------|----|---|--|
|      | (b) For sixty-six (66) inch<br>pipe, the sum of<br>dollars<br>and cents,<br>per lineal foot.....  | \$     | c. | 800   |  |
|      | (c) For ninety-six (96) inch<br>pipe, the sum of<br>dollars<br>and cents,<br>per lineal foot.....   |        |    | 250   |  |
|      | FENCING.  |        |    |   |  |
| 155. | For building tight board fence,<br>the sum of<br>dollars<br>and cents,<br>per lineal foot of fence built                                    |        |    | 2,400   |  |
|      | RESTORATION OF SURFACE.   |        |    |   |  |
| 164. | For restoration of pavement, as<br>follows:<br>(a) For stone block pavement,<br>the sum of<br>dollars<br>and cents,<br>per square yard..... |        |    | 500   |  |
| 166. | For restoration of curbing, the<br>sum of<br>dollars<br>and cents,<br>per lineal foot.....  |        |    | 100   |  |
|      | 230   |        |    |   |  |

(2) If this proposal is accepted, the undersigned will within five (5) days after the delivery of notice attend at the office of the Commissions in person or by duly authorized representatives, and will then and there deliver the contract with the States in the form aforesaid duly executed, and with its execution duly proved; and the undersigned will at the same time deliver to the Commissions pursuant to the terms of said contract *bonds in the sum total of five hundred thousand dollars (\$500,000) in the forms annexed hereto and made a part hereof, with the following named sureties, or, in the event that the following named sureties or any of them shall not be approved by the Commissions with such other sureties as the Commissions shall approve.*

It is understood that the acceptance of this proposal by the Commissions shall not be construed as an approval of the sureties named in this proposal and in case the sureties named in this proposal are not approved by the Commissions, the undersigned, within five (5) days after notice of disapproval or within such further period, if any, as may be prescribed by the Commissions, shall substitute the names of other sureties approved by the Commissions.

(3) If the Commissions shall notify the undersigned that this proposal is accepted, then if the undersigned shall fail within five (5) days thereafter or within such further period, if any, as may be prescribed by the Commissions to execute and deliver the contract or execute and deliver the said bonds, the undersigned may, at



the option of the Commissions be deemed either to have made the contract or to have abandoned the contract. And in the latter case the Commissions may give notice thereof to the undersigned and may thereupon proceed to make another contract with such, if any, of the original bidders as in the opinion of the Commissions it will be to the best interest of the States to contract with or may, with or without public advertisement, invite further proposals and the undersigned shall thereupon be liable to the States for all loss and damage sustained by the States by reason of such failure of the undersigned. Inasmuch as the amount of such loss and damage will be extremely difficult to ascertain, especially in view of the fact that the construction of the Tunnel is a part of the construction of the Vehicular Tunnel and that any delay in the construction of said Tunnel may delay the construction and completion of said Vehicular Tunnel, it is expressly understood and agreed that such loss and damage shall be liquidated and paid as follows: The undersigned shall pay to the States the expense of such new advertisement, if any, and in addition thereto the sum of one thousand dollars (\$1,000) for each and every day, except Sundays and legal holidays, that the States shall be delayed in entering into a contract for the making of said Tunnel by reason of such failure of the undersigned, and in addition thereto the excess, if any, of the amount of the bid, calculated from the quantities and prices contained in the proposal, which the States shall accept and upon which they shall enter into a contract for the construction of such Tunnel over the amount of the bid calculated from the quantities and prices contained in this proposal of the undersigned; which sums are hereby agreed upon not as a penalty but as liquidated damages which the States will suffer by reason of such failure of the undersigned. And the invitation and information for bidders and this proposal shall constitute a contract binding the undersigned

to pay to the States the loss and damage sustained by the States by reason of such failure of the undersigned as aforesaid.

(4) At the time of the delivery of this proposal to the Commissions the undersigned will separately deliver two certified checks for the sum of fifty thousand dollars (\$50,000) each, one payable to the order of the Comptroller of the State of New York and one payable to the order of the New Jersey Interstate Bridge and Tunnel Commission. And the undersigned hereby assigns to the States the said sums so especially deposited by the delivery of such certified checks as security for the performance of the obligations of the undersigned under this proposal. It is understood that said checks are to be returned to the undersigned when the contract for the construction of such Tunnel is executed and complied with, unless all the proposals submitted in response to said invitation and information for bidders shall be rejected by the Commissions and in that case when such proposals are rejected, as provided in the invitation and information for bidders. In case the undersigned shall default in the performance of any of the obligations of the undersigned under this proposal, the States shall have the right to apply the amount so specially deposited or so much thereof as may be necessary as a payment on account of the damages sustained by the States by reason of such default as aforesaid and shall return the balance, if any, to the undersigned. If the amount of such damages shall exceed the amount of said sums so specially deposited, the undersigned shall promptly upon demand from the Commissions pay the amount of such excess to the States.

(5) A notice that this proposal has been accepted addressed to the undersigned by the Commissions as aforesaid shall forthwith, at the option of the Commissions, operate as against the undersigned as a complete

CONTRACTOR'S PROPOSAL

making of a contract according to the form thereof as aforesaid, with the blanks therein contained filled in according to this proposal.

(6) The Commissions may cause any notice intended for the undersigned to be delivered at Room No. \_\_\_\_\_ on the \_\_\_\_\_ floor of the building No. \_\_\_\_\_ in the Borough of \_\_\_\_\_, in the City of New York, or Room No. \_\_\_\_\_ on the \_\_\_\_\_ floor of building No. \_\_\_\_\_ in the City of \_\_\_\_\_, N. J. Such delivery shall be sufficient notice to the undersigned.

(7) There are no persons interested with the undersigned in this proposal, except\*

(8) This proposal is made without any connection with any other person making a proposal or bid for the same purpose and is in all respects fair and without collusion or fraud. No member or employee of the Commissions is interested directly or indirectly, as contracting party, partner, stockholder or otherwise in or in the performance of the contract or in the supplies, work or business to which it relates or in any portion of the profits thereof.

Dated, \_\_\_\_\_, 1924.

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\*Here insert the names and addresses of all persons interested with the bidder. If there are no such persons, strike out the word "except."

CONTRACTOR'S PROPOSAL

County of New York, }  
State of New York, } ss.:

being duly

sworn, says: I am\*

the proposing contractor above named. I have read the foregoing proposal. The same is in all respects true.

---

\*If the bidder be an individual do not fill in this blank; if the bidder be a partnership, insert "a member of the firm of \_\_\_\_\_"; if a corporation, insert, "the (President or other officer duly authorized) of the \_\_\_\_\_ Company."

SURETIES' CONSENT.

That for and in consideration of the sum of One Dollar (\$1.00) lawful money of the United States, the receipt whereof is hereby acknowledged, and as an inducement for and in consideration of the receipt and consideration of the bid annexed hereto and for other valuable considerations,

consent and agree that, if the contract for which the preceding proposal is made, be awarded to

we will become jointly and severally bound as sureties for its faithful performance and will execute the bonds in the form annexed to this proposal in the sum of five hundred thousand dollars (\$500,000) when so required, as herein provided:

And if the said

shall omit or refuse to execute such contract within five (5) days from the time when notified by the Commissions or if we refuse to execute such bonds within the same time, then, we will pay, without proof of notice on demand to the said Commissions, any difference between the amount of the foregoing proposal and the sum to which the person, persons or corporations, to whom the



SURETIES' CONSENT

contract shall be finally awarded, would be entitled to receive upon such completion, the amount of said difference to be calculated upon the estimated amount of work by which the bids are tested, plus the expenses of readvertising, if any, and a sum of one thousand dollars (\$1,000) per day for each and every day, except Sundays and legal holidays, that the States shall be delayed in entering into a contract for the construction of the said Tunnel, as liquidated damages:

If we refuse to execute such bonds as aforesaid, then, the Commissions shall at their election, have the right to pursue any remedy at law or in equity, including an action for specific performance to compel the execution of such bond.

In witness whereof, the undersigned have signed this agreement (or the undersigned corporations have caused this agreement to be signed by their proper officials and their corporate seals to be hereto affixed) this  
day of \_\_\_\_\_, 1924.

SURETIES' CONSENT

Attach acknowledgments and statements of surety  
companies here.

SURETIES' CONSENT

State of ..... }  
County of ..... } ss.

On this ..... day of .....,  
1924, before me personally came .....

.....  
to me known and known to me to be the same person  
described in and who executed the foregoing consent,  
and ..... acknowledged to me that .....  
executed the same for the purpose therein mentioned.

.....  
.....  
(Title)

SURETIES' CONSENT

NOTE.—If the sureties are householders, the word “house” must be written in the following directions; if freeholders, the word “free” must be written. Each of these depositions must be signed by one of the proposed bondsmen and sworn to.

Additional blanks, if needed, will be furnished upon application to the Secretary.

State of ..... }  
County of ..... } ss.

The above-named .....  
being duly sworn, says that he is a ..... holder in

.....  
that he resides at .....

.....  
and is worth the sum of .....  
..... dollars (\$.....).

being ..... the amount of security required for  
the completion of the contract above referred to, over and  
above all his debts of every nature, over and above his  
liabilities as bail, surety, or otherwise, and over and  
above all his property which is exempt by law from exe-  
cution; and that he has offered himself as a surety in  
good faith, and with an intention to execute the bond  
required by law.

The following is a complete statement of all the depo-  
nent's assets and liabilities:

SURETIES' CONSENT

.....  
Subscribed and sworn to before me, this .....  
..... day of ....., 1924. ....

.....  
.....  
(Title)



# SURETIES' CONSENT

NOTE.—If the sureties are householders, the word “house” must be written in the following directions; if freeholders, the word “free” must be written. Each of these depositions must be signed by one of the proposed bondsmen and sworn to.

Additional blanks, if needed, will be furnished upon application to the Secretary.

County of ..... }  
State of ..... } ss.

The above-named .....  
being duly sworn, says that he is a ..... holder in  
.....  
that he resides at .....  
.....  
and is worth the sum of .....  
..... dollars (\$.....),  
being ..... the amount of security required for  
the completion of the contract above referred to, over and  
above all his debts of every nature, over and above his  
liabilities as bail, surety, or otherwise, and over and  
above all his property which is exempt by law from exe-  
cution; and that he has offered himself as a surety in  
good faith, and with an intention to execute the bond  
required by law.

The following is a complete statement of all the depo-  
nent's assets and liabilities:

SURETIES' CONSENT

.....  
Subscribed and sworn to before me, this  
..... day of....., 1924.

.....  
.....  
(Title)

SURETIES' CONSENT

NOTE.—If the sureties are householders, the word “house” must be written in the following directions; if freeholders, the word “free” must be written. Each of these depositions must be signed by one of the proposed bondsmen and sworn to.

Additional blanks, if needed, will be furnished upon application to the Secretary.

State of ..... }  
County of ..... } ss.

The above-named .....  
being duly sworn, says that he is a ..... holder in

.....  
that he resides at .....

.....  
and is worth the sum of .....  
..... dollars (\$.....),

being ..... the amount of security required for the completion of the contract above referred to, over and above all his debts of every nature, over and above his liabilities as bail, surety, or otherwise, and over and above all his property which is exempt by law from execution; and that he has offered himself as a surety in good faith, and with an intention to execute the bond required by law.

The following is a complete statement of all the deponent's assets and liabilities:

SURETIES' CONSENT

.....  
Subscribed and sworn to before me, this  
..... day of ....., 1924.

.....  
.....  
(Title)





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